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BULLETIN

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SUSTAINING ASSOCIATES

The thirty-two Sustaining Associates of the Entomological Society of America for 1961 are acknowledged by the listing of their names and addresses on the inside back cover of this issue of the BULLETIN. A like listing will also be found in the May issue of the ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA and the June issue of the JOURNAL OF ECONOMIC ENTOMOLOGY. The participation of these companies, foremost in their fields, in the Society has been acknowledged with individual thanks. Publication of the listings is further evidence of our appreciation. Nineteen of these firms became Sustaining Associates when the Society started this program in 1955. Such loyalty is deserving of mention. We hope that each of our members will use the Sustaining Associates list whenever they have need for basic insecticidal ingredients, other pesticidal materials, entomological services, or application equipment.

AUTOGRAPHA O O

CONSTITUTION AND BY-LAWS. Society members will recall voting last summer on an amendment to the Constitution. As announced at the Atlantic City meeting the amendment, actually the substitution of an entirely new Section XII to the Constitution, carried by more than two-thirds of the votes cast and was declared adopted. The 1961 Governing Board directed, as reported in the March 1961 BULLETIN, that the Constitution and By-Laws be reprinted to include the new Section XII as well as six new Standing Committees and such editorial corrections as had become necessary through the years. This has been done. As new members are accepted they receive a copy. Other members may get copies by writing to the College Park office.

MIAMI MEETING. Members who expect to attend the Miami meeting on November 27-30 this year should particularly note the first and last pages of this issue of the BULLETIN. We do not wish to be offensively repetitious but the deadline for submission of titles and synopses to the Program Chairman is August 15.

BUILDING FUND. When you totaled your 1960 contributions for your federal income tax deductions, was there an item covering a gift to the Building Fund of the Entomological Society of America? Many members, particularly in the Pacific Branch, were in a position to claim such a contribution. We hope you will join the group in 1961.

SOCIETY COMMITTEES. The 1961 Standing Committees, that is those elected at the annual meeting, were printed on pages 48 and 49 of the March 1961 BULLETIN. The Special Committees, that is those appointed by the president, will be found in this issue of the BULLETIN. Upon the membership of these committees devolves the greater part of the work of this Society. The thoughtful interest and, where applicable, clearly worded suggestions will, I am sure, be welcomed by the membership of any given Committee.

MEMBERS' ADDRESSES. This item comes in for attention in at least one AUTOGRAPHA O O column each year. If you are moving, or there is, or will be, a change in your address for any other reason, please advise us as soon as you can. Six weeks often elapses between the printing of an addressograph tape and a member's receipt of a given publication. A change received here after the tape is printed can apply only to succeeding issues. Is your address on this BULLETIN correct? Do you have a zone number? Write us at any time. Our members are our first concern.

BRANCH MEETINGS

The February 20 and 21, 1961 meeting of the Southwestern Branch at the Granada Hotel in San Antonio, Texas was mentioned in the March BULLETIN. The minutes of that very successful meeting are in this issue. Officers elected were Sherman W. Clark, *Chairman;* Manning Price, *Chairman-Elect;* and C. R. Parencia, *Representative on the Governing Board.* Alan C. Gunter continues as *Secretary-Treasurer.*

The North Central Branch held its 1960 annual meeting at the President Hotel in Kansas City, Missouri, on March 22-24, with Chairman D. M. DeLong presiding. More than 400 were registered. The business proceedings will appear in a later issue of the BULLETIN and a complete report in the *Proceedings of the North Central Branch.* Officers elected were L. K. Cutkomp, *Chairman,* and Roy W Rings, *Chairman-Elect.* Gordon C. Guyer continues as *Secretary-Treasurer.*

MIAMI MEETING PUBLIC RELATIONS

To assure full public-relations use of all papers to be delivered at the Miami meeting, it will be necessary to have two copies of each paper, together with twenty copies of a press release prepared from each, in the hands of Herman S. Mayeux, Chairman, Publicity Committee, 5636 Floral Bluff Road, Jacksonville 11, Florida, by November 1, 1961.

All persons presenting papers should take their manuscripts to professional newswriters so that news releases are properly prepared. State-employed entomologists can obtain this service from their State Editors, industry entomologists from their public relations or advertising departments. ARS (USDA) entomologists should send their manuscripts to the Current Information Branch, ARS, USDA, Washington 25, D. C., and other federally-employed entomologists to their respective Information Divisions.

Program Highlights

Annual Meeting of the Entomological Society of America

HOTEL McALLISTER, MIAMI, FLORIDA

November 27-30, 1961

Program Committee

GLEN E. CARMAN, Riverside, California
RALPH W. SHERMAN, Washington, D. C.
D. O. WOLFENBARGER, *Chairman*, Homestead, Florida

Special Features

The Society will meet in subtropical Miami on November 27-30, 1961. Our tours and exhibits this year will include visits to subtropical spots, especially as events for the ladies. Collecting trips are planned before and after the meetings whereby entomologists may make collections in the Everglades National Park. Tours into the farming sections and nearby areas are also planned. (Deep-sea fishing trips will be planned through definite prearrangements.) Extensive exhibits are planned both educational and industrial.

Many section and sub-section chairmen requested that emphasis be on genetics for the 1961 meeting. These chairmen, therefore, have been struggling with programs to bring to the ESA members discussions of the newest developments in the field of genetics. There will be no "theme" of the meeting this year in accordance with requests from a majority of the section and sub-section chairmen.

Plenary Sessions and Gatherings

Presidential Address—FRANK S. ARANT, Auburn, Alabama

Thomas Say Memorial Lecture—THEODORE H. HUBBELL, Ann Arbor, Michigan

Guest Speakers—J. E. DE WILDE, Wageningen, The Netherlands
B. T. SHAW, U. S. Department of Agriculture

Genetics Symposium—Speakers to be announced

Entomologists' Mixer

Entomologists' Banquet

Instructions for Submitting Titles And Delivering Papers

The following directions adopted by the Society in 1958 and modified by the action of the Governing Board in 1959 should be followed in the submission of titles and the timing of papers:

1. *Deadline for Receipt of Titles.*
   The deadline remains as August 15 and must be strictly observed if your paper is to be assigned a spot on the program. Please keep titles *brief* to avoid the necessity of abbreviating them in the printed program.
2. *Form for Submitting Titles.*
   An approved form for submitting titles is the tear sheet which is printed as the last page of this issue of the BULLETIN.
3. *Synopsis.*
   A block is provided on the form for submitting titles in which to clearly type or print, in a manner suitable for the printer, a synopsis (of 50 or fewer words) of the methods and results of your paper.
4. *Timing.*
   Authors of submitted papers will be allotted a maximum of 10 minutes for paper reading with a 2 minute interval between papers for discussion. Section and Subsection Chairmen will adhere strictly to this timing.
5. *Scientific and Common Names.*
   The correctness of common and scientific names should be carefully verified in "Common Names of Insects Approved by the Entomological Society of America," published in the BULLETIN, Vol. 5, No. 4, Dec. 1960.
6. *Assignment of Papers.*
   The *Program Committee* has the responsibility for assigning papers to sections and subsections according to subject matter, with due consideration to author's preference.

Features of Section Meetings

SECTION A—GENERAL ENTOMOLOGY

Section A is a co-sponsor of the Genetics Symposium discussed under Section C.

SECTION B—INSECT PHYSIOLOGY AND TOXICOLOGY

Section B is a co-sponsor with Section F of the plenary address by J. E. de Wilde entitled, "The Relationship between Hormones and Insect Ecology." A leading experimentalist in entomology from an international point of view, Dr. de Wilde, who is Director of the Agricultural University at Wageningen, The Netherlands, has been selected. As Director, Dr. de Wilde is administrator of programs of instruction in general and applied entomology. Investigations are being conducted in the Wageningen laboratories on insect endocrinology, physiology of diapause and reproduction, physiological action of photoperiod, host plant selection in phytophagous insects, histology and cytology of endocrine and neurosecretory mechanisms in insects, biochemical work on esterase inhibitors, fat metabolism in relation to diapause as well as several problems in applied entomology.

SECTION C—INSECT BIOLOGY

Section C is organizing a Genetics Symposium. Sections A and D are joining in its sponsorship as a plenary symposium. Papers are planned covering the following subject matter:

Basic Genetic Principles.
Physiological Genetics in Entomology
Behavior Genetics in Entomology
Population Genetics in Entomology

Speakers to be invited will be geneticists of international reputations with outstanding speaking abilities.

SECTION Ca—BIOLOGICAL CONTROL

Symposium: Integration of Chemical and Biological Control. Sponsored jointly with Section F. Moderator and speakers to be announced.

Discussion: It is planned to round out the session on Biological Control with a discussion period to permit the examination of various topics already covered.

SECTION Cb—APICULTURE (SOCIAL INSECTS)

Symposium: Recent Research on Behavior in Social Insects. Co-sponsored by Entomological Society of America, Bee Research Association and International Union for the Study of Social Insects. (Two sessions.)

Discussion: Informal. Research Problems.—Social Insects. (Anyone interested is welcome.)

SECTION Cc—INSECT VECTORS OF PLANT DISEASES

Symposium: Interactions Among Plant Hosts, Plant Viruses and Insect Vectors. Moderator: John N. Simons. Speakers to be announced.

SECTION D—MEDICAL AND VETERINARY ENTOMOLOGY

Section D is a co-sponsor of the Genetics Symposium discussed under Section C.

Panel: The Use of Chemosterilants for Insect Control.

Moderator, C. N. Smith. Speakers to be announced.

Invited Speakers: "Highlights of Medical and Veterinary Entomology for 1961".

Don W. Micks, University of Texas.

"Report of the 1961 Livestock Systemic Insecticide Work Conference".

William M. Rogoff, South Dakota State College.

SECTION E—CONTROL, EXTENSION AND REGULATORY ENTOMOLOGY

Invitational Papers: Industrial Approach for Forest Insect Control.

Pesticide-Wildlife Relationship.

Proper Use of Insecticides

Research Contributions to Regulatory Programs.

Developing Lures for Insect Detection and Eradication and Sterilization Techniques for Insect Eradication.

Pertinent Comments by an Official of the Food and Drug Administration.

SECTION Ea—EXTENSION

Panel: Obtaining and Disseminating Residue Information.

A. A. MUKA, Cornell University

J. E. BROGDON, University of Florida, *Chairman*

Invited Speaker: "The Role of a Specialist in Present Proposed Program"

M. P. JONES, USDA, Retired.

Panel: How Can Extension and Industry Best Work Together to Accomplish Their Mutual Objectives?

LLOYD E. ADAMS, Pennsylvania State University.

J. E. BUSSART, Velsicol Chemical Corporation.

JAMES N. RONEY, University of Arizona, *Chairman.*

Panel: Noxious Wildlife and Birds—Whose Problem?

R. B. DEEN, Fish and Wildlife Service.

DAVID F. YOUNG, Mississippi, *Chairman.*

Other Features: "The Place of Education in the Mosquito Control Program"

JOHN KILPATRICK, USPHS.

Residue Problems, Especially from Drift.

SECTION Eb—PLANT PEST CONTROL AND QUARANTINE

Panel: Need for Modernizing the Principles of Plant Quarantine and Supporting State Laws.

Panel: Developing Commodity Treatment for Regulatory Programs.

Invitational Paper: Industries' Responsibility in Organized State-Federal Regulatory Programs.

SECTION F—CONTROL INVESTIGATIONS

Symposium: Insecticides in Soils.

Moderator: L. D. ANDERSON, University of California. Speakers to be announced.

Symposium: Integration of Chemical and Biological Control; Joint Session with Section C-a. Speakers to be announced.

Invited Speakers: "Potentialities and Progress in the Use of Chemo-sterilants in Insect Control. E. F. KNIPLING, USDA.

"Water Pollution by Insecticides in an Agricultural River Basin." H. P. NICHOLSON, USPHS.

"The W.H.O. Program for the Selection of New Chemicals for the Control of Insect Vectors of Human Disease." R. L. METCALF, University of California.

PENNSYLVANIA STATE OFFERS INSECT CONTROL COURSE

About two-thirds of all kinds of animals are insects. Possibly 15,000 species could be found in any locality. Walter Haldeman of Pennsylvania State University says few of the thousands are serious pests and many are beneficial. Without pollination by insects three-fourths of our flowering plants wouldn't produce seeds and fruits. Without insects there would be fewer apples, pears, cherries, plums, melons, cucumbers and lima beans than now. Legumes, such as alfalfa and red clover, would set few seeds, therefore, propagation would be difficult. Production of seeds of cabbage, cauliflower, kale, kohlrabi, radish, carrot and parsnip depends on insect pollination.

However some insects do great damage. They devour or ruin at least 10 per cent of all crops. Insects infest stored grains and cereal products, fresh and cured meats, clothing, wood and objects made of wood, cigars and cigarettes. In short, almost anything of plant or animal origin.

Use of complex chemicals is one method of controlling destructive insects, but considerable knowledge is needed to use them effectively. Professor Haldeman says Pennsylvania State University has a correspondence course titled *The Principles of Insect Control.* It's a basic course for those interested in destructive insects of economic importance. Twelve lessons deal with insects and the effective use of modern insecticides.

You can enroll in the course by writing to Correspondence Courses, 202 Agricultural Education Building, University Park, Pennsylvania. Include the registration fee of $3.00 as a check or money order payable to The Pennsylvania State University.

PUBLICATION POLICIES OF THE ENTOMOLOGICAL SOCIETY OF AMERICA

and

MANUSCRIPT RULES AND SUGGESTIONS

The "Publication Policies and Manuscript Rules and Suggestions" for the ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA and the JOURNAL OF ECONOMIC ENTOMOLOGY were published separately in 1956. Many changes have been made since these rules were last published. Because the Society now publishes four journals and authors are sometimes confused as to which one is best suited to their needs, specifications pertaining to each are given in the following paragraphs. The Society journals include the ANNALS, the JOURNAL, the MISCELLANEOUS PUBLICATIONS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA, and the BULLETIN OF THE ENTOMOLOGICAL SOCIETY OF AMERICA. The Governing Board of the Society has defined the purposes and fields of interest of each journal, but these are amplified herein to include more specific instructions as to the kind of article desired.

PUBLICATION POLICIES

Where to Submit.—Authors wishing to have their papers published in one of the Society's journals (see Bull. Ent. Soc. America 5(1):33) should submit all manuscripts to:

Executive Secretary, Entomological Society of America, 4603 Calvert Road, College Park, Maryland.

The Managing Editor may decide, upon the basis of the area of interest, in which journal the manuscript will appear. The periodical preferences stated by the authors are of course taken into consideration in such assignment.

Nature of Content.—THE ANNALS.—The areas of interest for this bimonthly publication should include the fields of classical or basic entomology, such as taxonomy, biology, morphology, and physiology. Contributions accepted need not have as their objective immediate economic application or utility.

Contributions to the ANNALS and the JOURNAL *may not exceed 20 printed pages* and should include results of original observations and research. Papers with subjects of broad application, rather than a local or restricted application are preferred. Although basic research on economically important arthropods is well within the scope of the ANNALS, purely economic papers should be submitted for publication in the JOURNAL.

THE JOURNAL.—The areas of interest for this bimonthly publication should include such fields as chemical or biological control, surveys, regulation, toxicology, and physiology. In general, contributions accepted should have as their objectives, sometimes indirectly perhaps, practical application or utility.

In the case of papers which might go to either the ANNALS or the JOURNAL the editors should be governed by the historical character of each publication, and the objectives, expressed or in context, of each paper.

Papers acceptable for publication in the JOURNAL shall in general consist of progress or final reports on original biological, biochemical, or toxicological research and its application to applied entomology and closely related fields, including quarantine activities. Other papers dealing with economic entomology, such as those covering insect problems of wide interest, or reports on large-scale control activities, may be accepted at the discretion of the Editor with the approval of the Editorial Board. An important factor in the consideration of papers shall be their general appropriateness to the field of economic entomology.

MISCELLANEOUS PUBLICATIONS.—This publication, issued irregularly, was established primarily for the publication of papers dealing with aspects of fundamental entomology which may be of immediate interest to only a limited number of readers but which are *longer than 20 printed pages* (the present upper limit acceptable for publication in the ANNALS or the JOURNAL) but too short for the THOMAS SAY FOUNDATION MONOGRAPHS. Such papers will generally deal with taxonomic studies of vital importance to entomology but biological, ecological, morphological, and physiological studies may also be acceptable.

THE BULLETIN.—The BULLETIN shall appear quarterly and shall include items of current and timely interest, such as proceedings of meetings, common names of insects, lists of members, current notes, necrology notices, etc. Policies affecting the BULLETIN shall be determined by the Governing Board. The Executive Secretary shall serve as Editor of the BULLETIN.

The BULLETIN contains no original research papers. However, it does provide a place for articles of current interest, such as the President's Address and the Annual Memorial Lecture, and is an excellent medium for papers that are related to the field of entomology but do not specifically belong in the other three journals.

SCIENTIFIC NOTES.—A paper accepted for publication which would occupy less than one and one-half pages in 9- on 10-point type, including illustrations and tables, in the JOURNAL or the ANNALS shall usually be published in 8-point type as a scientific note. Preliminary studies, or fragmentary data, if they furnish *good leads for future study*, should be presented as scienitfic notes. The author's preference should be expressed when such papers are submitted, but the respective Editors reserve the prerogative to determine how papers shall appear. Descriptions of equipment and methods used in a particular experiment should not be submitted separately as scientific notes, unless they are of unique or of special interest. Scientific notes are published in the approximate order of their receipt independent of that of other papers. They shall be indexed and their titles shall be included in the table of contents. Scientific notes *must be accompanied by an abstract* on a separate sheet.

General Policy Pertaining to All Four Publications.—No manuscript that has been published elsewhere, either wholly or in essential part, will be accepted for publication. It should also be understood that such articles will not be offered for simultaneous publication in other journals without the consent of the Managing Editor of the Society. Authors are earnestly requested to cooperate in the administration of this policy.

Review articles containing little or no previously unpublished information are generally not acceptable since there are other more suitable outlets available. The primary criteria for approval will be the scientific merit of content and the clarity and conciseness of presentation. If the decision of the Editor is challenged, the paper will be referred to the appropriate Editorial Board.

Note: Many individuals contributed extremely helpful suggestions in the preparation of this revision. Special acknowledgment is made to the members of the Governing Board Committee on Publication Policy and to the Publication Officer and several other members of the Entomology Research Division of the U. S. Department of Agriculture whose criticisms were particularly pertinent.

Managing Editor

If found to be unacceptable, it will be returned to the author promptly with an explanation. Papers are unacceptable if conclusions are obviously unsound or based on faulty experimental methods or inadequate data. Acceptable papers must be prepared in accordance with the rules and suggestions presented herein. The Editors do not wish to enforce regimentation of style but many long-established policies, and others established by recent actions of the Governing Board, often require editorial action that authors may consider too arbitrary.

Abstracts.—Each manuscript, including scientific notes, must be accompanied by an abstract suitable for publication and transmittal to *Biological Abstracts*. This abstract will replace the usual author's summary. Each abstract should be typewritten (double-spaced) on a separate sheet (or sheets) of paper. It should be an informative digest of the significant content and conclusions of the paper and not a mere description. It should be intelligible without reference to the body of the manuscript. It should be brief (not more than 3% of the original) and written in whole sentences, not telegraphic phrases. Abstracts are not published with scientific notes but are sent directly to *Biological Abstracts*. A copy of a guide for the preparation of abstracts may be obtained free upon request to the Managing Editor.

Authorship.—At the Annual Meeting of the Governing Board in 1957, the following policy was adopted:

"Publication rights in the publications of the Entomological Society of America shall be extended to qualified nonmember authors upon endorsement and communication of their papers by a member of the Society. When a paper bearing the name or names of authors all of whom are nonmembers is published, a footnote shall be included showing the name of the member endorsing and communicating the paper."

The best interests of the Society shall govern acceptance of such papers. If the professional status of nonmember authors is not explained when their manuscripts are submitted for publication, the Managing Editor shall obtain such information. Nonmember authors who derive their livelihood from funds appropriated for entomological work, or who have a major interest in entomology, are urged to join the Society if they expect to continue to publish in the Society's publications. However, workers in other fields of science who are members in good standing of their respective national organizations are granted full reciprocity; they are not required to join the Society in order to publish papers occasionally under joint authorship with members. Student memberships at special rates have been provided for those individuals in training for a career in entomology. Those eligible should be encouraged to join the Society.

Date of Acceptance.—All papers accepted for free publication in the ANNALS or the JOURNAL shall be published in the approximate order of their receipt *in final form*. More prompt publication of acceptable matter may be obtained by payment of part of the costs as discussed herein under "Publication Costs." The phrase "Accepted for Publication _____" shall be included as a footnote to the title of every manuscript and the date of receipt of articles or scientific notes in acceptable form will be published with each paper.

Review of Manuscripts.—Preferably, each paper should be accompanied by the written recommendation of one or more persons who have a special interest in the subject of the manuscript, or, where pertinent, with a copy of approval of an Agency editorial reviewer or committee. Most manuscripts received by the Editors are sent for critical review to one or two authorities in the particular field concerned. The names of the reviewers are not revealed to the author unless requested by the reviewer or the author. Separate confidential reports are solicited from reviewers and are honored by the Editors. The author is given an opportunity to revise his paper after taking the reviewers' comments into consideration. When the revisions, if any, have been made, all pages of the original manuscript, as well as retyped ones, must be returned to the Editor for his consideration. Only heavily corrected pages need to be retyped. Instructions for making such corrections are discussed under "Preparation of Manuscripts."

It should be clearly understood that the referee system does not imply any reflection on the merits of individual papers but is followed solely for the purpose of improving the professional quality of articles appearing in the Society's journals *and* to reduce costs of publication by means of more concise and effective presentation wherever possible.

Use of Insect Names.—Common names of insects that have been adopted by the *Committee on Common Names of Insects* of the Society must be used in preference to other common names. Although there are certain types of papers, particularly in the field of taxonomy or genetics, in which it is advisable to use scientific names throughout, use of adopted common names is preferable for the most part. However, scientific names of insects and other animals should be given, even if accompanied by a common name, the first time they are mentioned in the abstract (unless their omission leaves it clear what species is under discussion) and also in the body of the text. Citation of the author (s) of a genus or species should be spelled out unless the abbreviation is universally understood. Scientific names of plants should also be given to conform with accepted botanical standards. All names should be checked carefully for accuracy and completeness. Authors are urged to consult the latest published list of common names of insects (presently in BULL. ENT. SOC. AMERICA, December 1960) before preparing their manuscripts.

Use of Insecticide Names.—Use of common names of insecticides that have been approved by the *Committee on Insecticide Terminology* of the Society is mandatory in all publications of the Society. Authors are urged to consult the last published list (presently in JOUR. ECON. ENT. 52:361-2) and supplements (JOUR. ECON. ENT. 52: 1032; 53:677,955) before submitting their manuscripts. A copy of this list and supplements may be obtained free upon request to the office of the Managing Editor.

Authors must describe clearly and specifically all chemical compounds with which they are working, giving their nature and their composition. In reporting experiments with formulations, such as wettable powders and emulsifiable concentrates, or in indicating dosage, the concentration of the active ingredient should always be given. It may also be desirable to give information, if pertinent, on the other ingredients included in a formulation.

Proprietary Compounds.—Papers containing data on chemicals, designated only by code, symbol, or generic name, must have the composition fully disclosed or they will not be accepted for publication by the Society. Trademarked names or code numbers may be used in Society publications until such time as common names are available for these compounds provided they are identified by their proper chemical names and the general courtesies of trademarked designations are exercised (Governing Board Action, 1958). The proper chemical name of each proprietary compound must be given the first time a compound is mentioned, in both the abstract and the body of the text.

Book Reviews.—All books, reviews of which are to be published by the Society, are assigned to reviewers in the office of the Managing Editor. Unsolicited book re-

views may be considered for publication if the book has not already been assigned to another reviewer. The right to reject solicited reviews is reserved. The reviewer of a book has accepted certain obligations. He should be fair to the author, the publisher, the Editor, the journal, and especially to the reader. The reviewer should make an appraisal of the book with the interest of the reader the prime consideration. If it is a good book with some faults, or a poor book with some good points, these should be made clear. If it is not a first edition, the change should be indicated.

Promptness by a book reviewer is especially desirable. The longer the lapse between publication and review, the less valuable the review becomes. Preferably, reviews should be between 250 and 500 words, and should never exceed 750 words.

MANUSCRIPT RULES AND SUGGESTIONS

The ever-increasing cost of printing can be offset most effectively by preparing the printer's "copy" in the best possible form. Authors should prepare manuscripts so that the typesetter may work rapidly and accurately. Adherence to the following rules and suggestions will permit more prompt publication of a greater number of papers and will reduce appreciably the cost of processing and printing.

Style and Format.—Authors should determine style and format by examining recent issues of the journal in which they wish their manuscripts to appear. In addition to an up-to-date dictionary (*Webster's New International* is preferred), authors should consult the *U. S. Government Printing Office Style Manual* (Rev. ed., 1959). Authors may also obtain valuable suggestions from the *Style Manual for Biological Journals* (Committee on Form and Style, Conference of Biological Editors, 1960). Consistency of style and format is an unattainable ideal but is nevertheless worth striving for.

General Instructions.—The title of a paper should be short and concise but should include both the common and scientific names of insects unless widely known. The author citation usually need not appear in titles. The manuscript should be clearly typewritten on one side only of opaque paper at least 8 x 10½ inches, *double-spaced* (including all footnotes, legends, quoted matter, references cited, tables). Typewritten lines should not exceed 6 inches in length. The printer works with the typescript mounted in a frame that exposes only a few lines at a time; therefore, corrections in the typed manuscript should always appear at the same level as the line in which they are made. Additions should be made by cutting the manuscript and inserting the addition in its proper place. Inserts of one or two words may be made in the margins.

To expedite reviewing and editorial processing, submit the ribbon and one carbon copy of the manuscript. Place name and address of the person to whom galley proof is to be sent on the upper right-hand corner of the first page. Number pages consecutively. Mail flat without stapling together.

Headings (center, side, sub-) are desirable but should be informative and not mere labels or tags. Headings used should be in accordance with recent issues of the journal for which the manuscript is prepared. Underline only names of *genera* and *species* and, sparingly, *those words requiring italics for special emphasis.*

Number text footnotes consecutively with superscript Arabic numerals and list on a separate sheet of paper at the end of the manuscript. Table footnotes should be shown alphabetically with lower-case letters, starting with the title and upper left-hand corner. List table footnotes alphabetically (double-spaced) at the bottom of each table in separate paragraphs. Footnotes are expensive for the printer to set and should not be used if the same information can be presented logically in the text.

Tables.—Tables are expensive to print. Therefore tables and titles of tables should be short, concise, meaningful, and self-explanatory. Tables should be used only when the same information cannot be as logically presented in the text or by illustrations and should present only those data that are essential for the reader to judge the validity of the conclusions. Each table should be placed on a separate page(s) at the end of the text and numbered consecutively. Reference to each table must be included in the text.

For an analysis of variance only the source of variation, degrees of freedom, and mean squares should be presented. Significance may be indicated by * or ** for the 5- and 1-percent probability levels. A table of means should be presented only for those sources of variation that are significant in the analysis of variance. Individual values, observations, or means should never be presented unless they are referred to in the text and are used to support a conclusion or recommendation. Significant difference between treatment means should be indicated with lower-case letters.

All tables that have similar headings or contents should be combined and the number of columns reduced to a minimum. Place a double horizontal line below the title and a single horizontal line below each column heading, the heading box, and at the bottom of each table. Use no other lines in tables.

Authors submitting excessive tabular material will be asked to reduce the size of this material or to pay additional charges to partially cover their cost.

References Cited.—References to scientific literature, unpublished reports, and personal communications should be accumulated in a list, arranged alphabetically by author's last name and typed double-spaced on a separate page at the end of the text. Unpublished data should not be cited as "in press" until accepted for publication by the journal for which it was prepared. Citations should give author's name(s), year, title, name of publication, volume, number of issue or month, and pages, in the order named. To obtain greater uniformity in the abbreviations used in references cited, authors should be guided by the latest list published by *Biological Abstracts.* (See Volume 35, No. 20, October 15, 1960).

Illustrations.—These should be clear and unquestionably suitable for reproduction. They should contribute materially to the information presented in the paper. Specific reference to each illustration must be made in the body of the text. Use of illustrations not original with the author must bear permission for their use and credit must be given to the originator. Illustrations, run as text figures, are designated by Arabic numerals.

Full-page illustrations when printed may not exceed 6 x 9 inches (37 x 54 picas), *including legends.* Single-column illustrations may not exceed 3 inches (18 picas) in width. If feasible, graphs and other line drawings should be constructed with their greatest dimension vertical.

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Entomological Contributions to Human Welfare[1]

Foreword

By ORDWAY STARNES

Professor of Entomology and Associate Director, New Jersey Agricultural Experiment Station, Rutgers — the State University

Entomological contributions to human welfare challenge the creative imagination of the most thoughtful person. Many of these contributions were enumerated in the course of a panel discussion sponsored by the Section E Control, Extension and Regulatory Entomology during the 1960 Annual Meeting of the Entomological Society of America.

Through the development of this important and timely topic, the Program Committee, the Panel, and membership of the Entomological Society of America reflect credit and enhance the prestige of the Society.

The Panel's introductory presentation by Administrator Huffman clearly conveys that the practical value of research progress depends on its being interpreted to the masses. The Co-operative Extension Service, by a mandate, is the interpreter for our Society. The Service stands between the layman whose knowledge of entomology is indefinite and the scientist whose knowledge of the subject is authoritative.

Director Burgess' presentation describes the role of this Division of the ARS and Cooperating Agencies in reducing and preventing the hazards presented by domestic pests.

In a complementary presentation Assistant Director Dean eloquently described the economic and social implications of reported invasions of foreign plant pests, including diseases. These examples clearly convey the vital role to be played by Plant Quarantine Division workers and cooperators in protecting society in a world rapidly diminishing in size through transportation progress.

Dr. Hughes, Assistant Chief of Entomology of the U. S. Public Health Service, contributed a most interesting presentation on the subject of The Prevention of Spread and Control of Insects of Public Health Importance. Dr. Hughes' presentation conveys that while our science of Entomology is young so also is the human race in comparison to insects. The influence of insects on civilization and on the presence and possibly on the absence of certain organisms in our environment has been most profound. This interesting paper by Dr. Hughes is deserving of your attention.

Complementing the presentations by Directors Burgess and Dean, Chief Harper has not only interpreted regulatory programs in terms of the example state, California, but has expanded the topic to include consideration of its significance to society as a whole.

[1] Panel discussion by invitation speakers at the Atlantic City meeting of the Entomological Society of America, November 28, 1960.

Entomological Contributions to Human Welfare

Through Extension

By GERALD H. HUFFMAN

Deputy Administrator, Federal Extension Service, U. S. Department of Agriculture

I would like to begin this paper by congratulating the *Program Committee* for selecting such a timely and informative theme for the 1960 Entomological Society Annual Meeting. The science of entomology and the entomological profession have contributed much to the welfare of mankind, not only in the United States but also throughout the world. It is proper that the many ways in which entomology has benefited the people of our nation should be set forth and called to the attention of the general public through the occasion of this Conference.

The topic assigned to me concerns the ways in which extension has contributed to the welfare of the people of the United States through educational programs designed to help farmers and others control harmful insects and similar pests.

Broadly stated Cooperative Extension, in contrast to University General Extension, can be described as the function of carrying by educational means the results of agricultural and home economics research to people interested in understanding and in applying these findings. The Agricultural Extension Service was created in 1914 through the passage of the Federal Smith Lever Law, and was established as a Federal-States public service to systematically and effectively disseminate the new knowledge of agricultural and home economics research to the people of the United States. In this connection, it is interesting to recall that some Extension work carried on by U. S. Department of Agriculture employees just a few years prior to the passage of the Smith Lever Law—a work which aroused great interest and support for a nationally financed Extension Service—was in the field of entomology. I refer here, of course, to the cotton boll weevil control demonstrations carried on in Texas for approximately 10 years prior to the passage of the Smith Lever Law.

Today, the Cooperative Extension Service has come a long way from those early days of the cotton weevil control demonstrations organized by one of the pioneers in Extension work—Dr. Seaman A. Knapp. The Cooperative Extension Service system now consists of over

11,000 county extension agents and nearly 2,900 subject matter specialists, about 80 of whom are specialists in entomology. The State Extension Services are integral parts of their respective land grant colleges of agriculture, and most Extension Service employees are joint employees of the U. S. Department of Agriculture and their State land grant school. County agent teachers supported by subject matter specialists extend to farm people, non-farm rural people and also urban dwellers, the results of entomological research and other agricultural research generated by the State Experiment Stations and the U. S. Department of Agriculture. Extension personnel also cooperate with other public agencies and services by providing farmers information about control and regulatory work in the field of insect eradication.

Speaking more directly to the contribution of extension programs in entomology to the general welfare, we might cover the subject briefly under the following headings:

— Aid to Efficient Food and Agricultural Fiber Production
— Insect Eradication in Stored Food Grains
— Safe Chemical Use in Quality Food Production
— Insect Control on Flowering Plants, Ornamental Shrubs and in the Household
— Assistance to the 4-H Club Program

I do not wish to imply that extension work is the only force which applies the science of entomology in the interest of human welfare in the above categories. However, Extension does conduct educational work in each of these, as well as some other important areas. Parenthetically, it should be added here that the extension work in the field of entomology includes assistance to people in the control of pestiferous spiders, snails, bugs, rats, mice, gophers and the like in addition to helping them follow practices to control and eradicate harmful insects.

Aid to Efficient Food and Agricultural Fiber Production: According to field reports from county agricultural agents in over 3,000 counties, extension recommendations were made to well over a million farmers in response to their requests for insect control measures to protect their food and feed grains, hay and pasture, vegetable and fruits, from serious damage or even complete ruin. Over 500,000 cotton and tobacco farmers were given aid in insect control practices for these important crops in the agricultural economy. Other farmers were provided extension guidance in insect control indirectly through insecticide dealers and others who attended extension training schools on pesticide application practices and who received and distributed to farmers educational leaflets on various entomological practices.

One of the oldest and most effective extension programs in helping farmers produce an abundance of quality food is the spray service program directed primarily to orchardists. This program requires the coordinated effort of selected orchardists, county agents and the entomology and plant pathology extension specialists and research scientists located at the State Colleges and Experiment Stations. It also makes use of radio and television, as well as timely grower letters and bulletins, to keep the orchardists informed of kinds of insecticides to use, number and timing of control applications depending upon insect populations, seasonal weather and day-to-day temperature variations. The results of this one example of extension work in entomology bolster the fruit grower's income and provide an abundance of high quality fruit for the consumer.

The dollar value of extension education in insect control to farmer producers of the nation's food, cotton and tobacco supply is difficult to estimate but in a Middle Atlantic State this past year, it was calculated that extension spray information to 7,377 apple growers accounted for an additional $1,000,000 to these orchardists alone.

And from the consumer's standpoint it was found that the sprayed apples were 95 percent free of insects whereas unsprayed apples had 97 percent insect injury. In this same State, potato growers saved from 25-40 dollars per acre by following the Extension limited spray program based on need rather than on regularized applications.

Taking one more example of entomology's contribution to modern farm production and increased farm income—in a southern cotton producing State, farmers profited last year (1959) to the tune of about 75 million additional dollars in income by controlling cotton insects more effectively. Extension contributed to this higher income by conducting nearly 900 field demonstations and by holding 442 cotton insect scouting schools attended by more than 7,000 farmers. Approximately 80 percent of the State's cotton crop in 1959 was scouted according to extension recommendations.

Similar instances could be cited of other impacts which extension teaching has made on improved farm production through the application of scientific insect control measures. But enough has been said to point up the contribution of extension entomology to the advancement of a more efficient farming industry capable of holding down serious insect losses.

Insect Eradication in Stored Food Grains: It is well known that stored grain insects, rodents and similar pests cause great damage to stored feed grains and to such food grains as wheat and rice. As a case in point, it is estimated that Louisiana farmers suffer an annual loss from the rice weevil of at least $5,000,000. Total losses to farmers and the U. S. public from stored grain insect damage run around a 10 million dollar figure annually. In addition rats and similar pests cause food and feed grain losses of even greater magnitude and are a health menace.

Several years ago the Cooperative Extension Service, in collaboration with other agencies of the U. S. Department of Agriculture, the Food and Drug Administration of the U. S. Department of Health, Education and Welfare, Fish and Wildlife Service of the Department of Interior, farm organizations and the grain trade, launched an intensive educational campaign to help farmers and other storers of food grains follow improved insect and other pest control programs. The campaign went under the name of a "Clean Grain Program."

The Program received an initial impetus in the spring of 1955 when the Federal Extension Service set up a special Clean Grain Committee to help bring all forces and pertinent information to bear upon the grain sanitation problem. One of the first steps taken by this committee was to call a meeting in Washington of grain industry and farm organization leaders and representatives of educational and regulatory agencies to lay the framework for a national attack upon the problem.

The Washington meeting spotlighted the need for an educational program that would coordinate the efforts of every individual and organization having an interest in clean grain. To help do this, educational materials in the form of fact sheets, brochures, and visual aids were provided State Extension Services and other interested organizations and agencies.

A comprehensive summary of all educational materials available from educational and industry groups was prepared and distributed to cooperators in the clean grain program.

Within the Extension Services—Federal and State—the extension entomologists, together with the marketing

and engineering specialists, provide leadership for this grain sanitation program. Over the past five years this program has reduced insect damage and rodent contamination considerably as noted by the reductions in food grain seizures made by the Food and Drug Administration during 1959. Also, recent State and Federal grain inspection and grading reports indicate that food grains are cleaner now, a fact attributable, at least in some part to this program. This reduction in damage has benefited the farmer producers, grain elevators, transport companies, millers and other food processors and, by no means least, the consuming public.

Safe Chemical Use in Quality Food Production: The importance of agricultural chemicals to efficient farm production is well known. The proper use of these chemicals in food production under a considerable range in conditions is a big and complex job, and one in which many people have an interest—the farmer grower, chemicals distributor, processor of food products, many categories of public officials and also the ultimate consumer.

The gigantic task of counseling farmers on how to use pesticides and other agricultural chemicals in a manner which will increase production efficiency and at the same time assure wholesome, healthful food products for consumers is, in considerable degree, an educational assignment. Since insecticides are widely used chemicals which must be applied with recommended precautions, it is understandable that our nation's extension entomologists stand out as key people in the educational job of helping farmers produce residue-free food through exact recommendations as to kind of insecticides to use, on what crop, in what amounts, and at what times.

Long before the cranberry episode of a year ago brought the problem of proper use of agricultural chemicals into the limelight, extension entomologists had been working through county agents with farmer growers of fruits and vegetables on safe insecticide use to assure residue-free food. Their efforts in this direction have been increased over the past year and will be stepped-up even more in the future as new and more potent insecticides come into use.

According to a recent statement by the Secretary of Agriculture, the United States food supply is the safest, cleanest and most wholesome of any food supply in the world. The extension entomologist, historically and currently has been and is contributing to this kind of food quality—not alone of course, but in collaboration with other public officials and private industry people who are working with them.

Insect Control on Flowering Plants, Ornamental Shrubs and in the Household: Up to this point this paper has been dealing with the contribution of the extension entomologist in educational programs designed to help farmers and others produce safe, high quality food (and also agricultural fiber and tobacco) as efficiently as possible. To round out the picture of the extension entomologist's contribution to human welfare, a word should be said regarding his role on the esthestic side of living, namely, assistance to home owners in keeping their surroundings beautiful and free of annoying insect pests.

During 1959 county extension agents filled over 3 million requests from commercial growers of flowers and ornamental shrubs and just John Doe home owners who needed help in controlling insects on their flowering plants, ornamental shrubs, in the household and similar pests. More and more requests in this category have been coming from suburban families whose numbers have increased greatly around the fringes of our metropolitan areas. Extension entomologists have backstopped county agents in filling requests from home owners by preparing special letters, leaflets and visuals, radio and television talks, newspaper articles and so on. In some of the highly urbanized counties where telephone calls on home gardening, lawn care and landscaping problems run into the 1000's weekly, automatic telephone answering services have been installed in the county extension offices to handle routine insecticide and fungicide recommendations.

With possibly even larger numbers of this nation's families living in suburbia in the future, the workload of Extension and the extension entomologist with this audience group will probably increase over the next 10 years.

Assistance to the 4-H Club Program: Before concluding this paper a word should be said about the extension entomologist's contribution to human welfare through the 4-H Club Program. At present 4-H Club work, which is under the direction of the Cooperative Extension Service, enrolls yearly something over 2¼ million young people between the ages of 10 and 21. The uniqueness of 4-H Club work is in the carrying on of a project, by enrolled members, tailored to the maturity of these youth. Through 4-H Club projects young people gain knowledge and experience by doing.

Among the very useful, successful and interesting 4-H Club projects is the Entomology project. This project is given technical direction by extension entomologists. In addition to its other attributes, the entomology 4-H project is a most effective, and universal 4-H educational activity because it can be taken by boys or girls who live in towns and cities as well as by youth residing on farms. It is a project requiring skill and exactness in record keeping. It is an excellent project to get young people interested in science and the rigorous discipline of science in general.

At the present time 4-H boys and girls carrying an entomology project total 56,700. It is not the intent of this project to make entomologists out of every boy or girl who selects such a project for his or her 4-H program, although through experienc in this project he or she may decide to follow entomology as a profession. Or, if not that science, perhaps some other branch of science. But the main point is that through the entomology project the extension entomologist contributes to an educational experience that helps develop the 4-H Club member into a better youth and a better citizen. In what better way can any profession contribute to the welfare of mankind?

In conclusion, this paper has attempted to point up some of the more important ways in which the extension entomologist contributes to human welfare through the educational program of the Cooperative Extension Service. No claim is made here that the areas covered are all inclusive of the fine work being done by Extension under the general leadership of the Service's entomologists. Neither is there any intention to give the extension entomologist credit for work done by many other people in public and private entomological occupations including regulatory, control and research personnel. However, it can be said here without reservation, that the discipline of entomology contributes greatly to the valued substance of Extension's overall educational program. The extension entomologist is the key source of competence in this field within the Extension Service family, and rightly can lay a claim to be among those who have dedicated their lives to public service in the interests of the well being of the people of America.

Entomological Contributions to Human Welfare

Through Pest Control

By E. D. BURGESS

Director, Plant Pest Control Division, Agricultural Research Service, U. S. Department of Agriculture

Entomologists have a right to be proud of their profession and their accomplishments. Their efforts have contributed greatly to the human welfare of the United States and the benefits of their work are being felt throughout much of the world. At a time when the subject of agricultural chemicals is being critically reviewed, it seems particularly appropriate for us to take a close look at some of these accomplishments and point out a few of the many cases where control has paid off. If such can be demonstrated, and I believe it can, we, as entomologists, must make a concerted attempt to once again bring about an understanding public to overcome the current skepticism towards insect control. To us this seems imperative, if we are to maintain an uninterrupted abundance of quality food, forage, and fiber. The contributions of the past may prove to be one of our most effective weapons in supporting our belief in the need and urgency of protection against insect pests. Let's look at the record.

It was Asa Fitch, the first entomologist appointed to a professional post in New York on May 4, 1854, who said, "There is no kind of mischief going on in the world of nature around us, but what some insect is at the bottom of it." If we think about this statement a minute we can recall numerous instances where the deviltry of insects has played a vital part in bringing about changes in the economy of the United States. Some may have been good, the majority certainly were bad.

Years ago mosquito-borne malaria in the Southeast debilitated slaves so that they could not effectively work the rice plantations of Georgia and the Carolinas. This had a rather serious effect on the economy of that section of the Southeast. Other rich agricultural and industrial areas of the South, until very recent times, were similarly affected. The control of malaria mosquitoes and the reduction in the incidence of the disease was an important contributing factor to the rapid development of agriculture and industry in the South.

White men made little progress in carrying their civilization into the tropics until they learned among other things that mosquito control would abate yellow fever and malaria. Tsetse flies still keep prosperity from certain places of Africa. Suppression of mosquitoes in Panama enabled the building of the Canal, which has been vital to our defense and has had a tremendous impact on overwater transportation, particularly from our east coast to our west coast. Fly control has brought about similar health benefits. Now we can go about our business throughout much of the world with little fear of most of the diseases these vectors carry.

According to some authorities, the chinch bug made Wisconsin a dairy State. In the early days Wisconsin farmers generally relied on small grain crops like wheat, oats, and barley. During the late 1800's swarms of chinch bugs destroyed these crops. Many farmers grew discouraged, abandoned grain, and became interested in dairying.

The cotton boll weevil destroyed the one-crop economy of the South, forcing diversification which led to a new and different agricultural era. This included the introduction of the livestock industry, the development of which was seriously challenged until the cattle tick was brought under control. These are but a few of the examples which illustrate the tremendous impact insects can have upon a country and its citizens. One has only to visit some of the underdeveloped countries of the world to get a present-day picture of how insect pests of one kind or another are still a most important factor in impeding progress.

It has been estimated that there are some twenty thousand insect species that are destructive crop pests throughout the world. Realizing the diversity of our climate, our agriculture, and the possibility of inheriting many of these unwanted pests, we must admire the work of port inspectors who continually guard our borders and effectively deter them from entering and becoming established. At least half the injurious insects known to occur in this country were introduced from foreign countries. A large percentage of these became residents prior to 1912 before the Plant Quarantine Act was approved. Prior to this the United States was said to have been the dumping ground for substandard nursery stock, which has been implicated in bringing a number of serious pests to our shores. Along with this and the importation of other commodities at least 92 species of our most important pests were introduced into the United States. Included were such well-known insects as the horn fly, asparagus beetle, San Jose scale, greenbug, Argentine ant, and the alfalfa weevil, to name a few. Others, such as the gypsy moth and boll weevil, found different means of entry. It is interesting to note that since 1912 only some thirty generally considered important economic insects of foreign origin have become established in this country. This is a remarkable record when we consider that it was made during a period when imports and international passenger travel have mushroomed both in terms of volume and speed. The movement of pest insects from one state to another through channels of trade has been impeded with equal effectiveness through individual state quarantines and through Federal domestic plant quarantines. There are some interesting comparisons which tend to point out the effectiveness of regulatory action.

The Japanese beetle was found in New Jersey in 1916. The extent of the original infestation indicated that the insect probably had been in the United States some nine or ten years prior to that—or perhaps even longer. A Federal quarantine was established in 1919. While natural spread has not been stopped, it is important to note that only about 6½ percent of the area of the United States is now generally infested. Its long-distance spread has been held to a minimum through regulatory action. Artificial controls have been greatly improved over the years. A number of parasites have been introduced and successfully colonized which aid in the suppression of the pest, particularly in the older areas. There is every indication that a breakthrough in the propagation of milky disease on artificial media may not be far away. This will open up other ways of coping with it. Soil insecticides are extremely effective, though costly. We believe that the time is not too distant when it may be possible to retard its natural expansion even more effectively. While such an objective has not been realized yet, the delaying action through quarantines has saved

farmers in noninfested areas millions of dollars in insecticide costs because of freedom from the beetle. They do not suffer the loss in quality or quantity this insect can inflict. In infested areas farmers and homeowners alike find the Japanese beetle an expensive luxury. The costs of milky disease spores or insecticides to protect turf, flowers, and crops are now excessive, and losses due to the beetle are severe. These problems are foreign to 93 percent of the country still free of Japanese beetle.

On the other hand, let's look at a somewhat comparable case. The European corn borer entered the United States, apparently in a shipment of Hungarian broomcorn about 1907, in the vicinity of Boston, Massachusetts. When discovered in 1916 it had spread over some 400 square miles. By 1921, when quarantines were established, it was known to infest limited areas in Connecticut, Massachusetts, New York, Ohio, and Ontario, Canada. Despite a Gargantuan effort around 1928 to overcome a worsening situation, the lack of adequate control information and the economy of the times soon forced an abandonment of the program. In 1932 the Federal European corn borer quarantine was revoked. Only reduced research was continued. No further organized effort was made to suppress or contain corn borer infestations and it expanded without restraint, except that state quarantine action continued to regulate the movement of corn borer carrying commodities in some parts of the country. The corn borer now infests all major corn-growing areas east of the Rockies. In the year 1949 this insect caused a loss to Corn Belt farmers in excess of 345 million dollars.

Let's make another comparison. The white-fringed beetles, natives of South America, were found in northwest Florida in 1936. These insects are general feeders. The adults attack more than 170 kinds of plants, the grubs feeding on the roots of some 385 different plant species. Federal or state quarantines have been in effect against these insects since 1936. These beetles remain under continuous regulatory attention which has been instrumental in keeping them confined to relatively small areas aggregating less than a million acres in the Southeastern States. On about 25 percent of these where organized suppressive work has been undertaken, no infestation has been found for three years or more. This was brought about by an orderly, well-planned treatment offensive. It is now a rare thing to have serious white-fringed beetle damage reported, yet years ago it was difficult to grow some host crops on infested land. New insecticides and new methods of applying them bring the hope closer to reality that white-fringed beetles can eventually be eradicated.

Compare this with the Mexican bean beetle. This pest is thought to be a native of Mexico and was first found in Alabama in 1920. While it usually feeds on beans, it will attack soybeans and cowpeas, and sometimes when infestations are heavy alfalfa, clover, vetch, and certain grasses. The Mexican bean beetle was allowed to spread at will. It was not considered serious enough to warrant regulatory or control attention. Even though its feeding is limited to a narrow range of food plants, by 1935, only 15 years following its discovery, the Mexican bean beetle infested most of the area east of the Mississippi River; and by 1955 damage and control costs were excessive in portions of Arkansas, Iowa, Louisiana, Missouri, and elsewhere. No regulatory or control measures were initiated against the Mexican bean beetle until it showed up in California. There, unwilling to see it create the tremendous losses occurring elsewhere, the State took aggressive action and stamped it out over a period of 9½ years at an expense of about $980,000. Today, California is free of this pest. While this may appear to be a great deal of money to spend in coping with a plant pest, this successful campaign is undoubtedly saving the farmers of California many millions through freedom from Mexican bean beetle damage and accompanying pesticide costs.

There are other notable examples of containment worthy of mention. The gypsy moth is still confined to the New England States and parts of eastern New York; yet, it could inhabit much of the eastern United States.

The pink bollworm has not crossed the Mississippi River to the east or the California State line to the west, yet it could infest all areas where cotton is grown. Seldom is damage reported from infested areas where generally accepted cultural practices not conducive to the normal development of the insect are carried out. Yet it is reported to be one of the most destructive of cotton pests elsewhere in the world.

The khapra beetle has not become established in any of our major grain terminals or warehousing facilities. The cooperative eradication and quarantine effort has been instrumental in bringing this about. Currently the treatment program is well ahead of the detection of new infestations. Barring new outbreaks, we are anticipating an end to the khapra beetle problems. Together with our state cooperators, which include the Republic of Mexico, we would soon like to say that prompt and aggressive action has once again corrected a serious problem that might have caused additional millions of dollars' damage had the pest been permitted to run its normal course.

Though not an insect pest, the golden nematode has been confined to Long Island, New York. With the recently inaugurated eradication program there, we and the State of New York hope to free the United States from another serious plant pest which is considered to be most destructive to potatoes in many parts of the world.

It was not until late in the 19th century that anyone seriously considered the possibility of eradicating an introduced insect pest once it had become established. For some reason the term "eradication," when applied to insects or plant diseases, is not palatable to some entomologists, conservationists, and others. The successes in this field, however, make it difficult for us to agree that such is impossible or that it is not feasible under proper circumstances. We believe that eradication of important foreign pests should be attempted when there is a fighting chance that it can be accomplished safely. We should not accept the premise of learning to live with an invader of this kind unless there appears to be no other recourse, or where costs are exorbitant in relation to other values. The ever-increasing expense of preventing damage on an annual basis and the attendant residue and other problems seem to lend support to the eradication approach, whenever such is possilbe. We should look back at those cases where success has been achieved and think what these might mean to us now had they been permitted to run their normal course.

A number of plant pests have been eradicated from the United States. These are the Mediterranean fruit fly, twice in Florida; the parlatoria date scale from several places in Arizona, California, and Texas; the citrus blackfly, twice, in Key West, Florida, and from the Rio Grande Valley in Texas; the white garden snail from several counties in southern California; a new dry wood termite from Houston, Texas; citrus canker, in the Gulf Coast States; and more recently, Hall scale in California. We hope to add the khapra beetle to this list at an early date.

Control agencies have also been able to eradicate isolated infestations associated with some current problems, even though they are still present in other parts of the

United States. The pink bollworm was eradicated from Florida. The more recent effort in part of Arizona promises to be successful. The gypsy moth is no longer in Michigan, New Jersey, Ohio, and Pennsylvania. The Mexican fruit fly has been exterminated from southern California. The imported fire ant is not known to exist in Arkansas, North Carolina, and South Carolina. The common barberry, alternate host of wheat stem rust, has been eliminated from a number of Northern States.

These efforts have shown the way and we count them as major contributions in pest control. Should we have held back and submitted our growers to the ever-increasing expense and complexity of annual control when such could be avoided through an aggressive attack? We don't believe so.

What about native pest problems? Entomologists have had a major role in keeping the American people the best fed in the world. Through their intelligent directions for the prudent use of pesticides and because of their efforts in the field of biological control, the housewife can confidently go into any supermarket and purchase quality food at a reasonable cost free from insects. She can also be sure that the produce she buys for her family does not contain harmful residue of pesticides. On our farms, pesticides enable farmers to produce the great variety of foods people want in the tremendous amounts needed. These are also protected from the ravages of pests while in transit or in storage. Many fruits and vegetables could not be grown successfully without the aid of chemicals. The codling moth, for instance, would have a field day in our Nation's apple orchards. The green bug and chinch bug could destroy great quantities of our small grains. Without pesticides many quality vegetables would be worth their weight in gold and might not be available at all. In short, insect control with chemicals is just as important as proper fertilization, efficient farm machinery, and rapid transportation in feeding an expanding population.

It has been conservatively estimated that insects, diseases, nematodes, and weeds reduce the value of the United States agricultural and forest production by more than ten billion dollars each year. Classic examples of some of the most damaging of these pests include the boll weevil, only one of several important cotton pests which causes losses from 100 to 200 million dollars each year; the European corn borer, 80 million dollars; and the stem rust diseases of cereals, 50 million dollars. You are familiar with the complete destruction of the chestnut by blight and the defoliation of a million and a half acres of hardwood in 1953 by the gypsy moth, and the frequent depredations of the spruce budworm and other forest pests. The U. S. Forest Service reports that in a single year insects alone destroy enough saw timber to build 1.3 million homes.

In 1960, and for a few years yet to come, perhaps we in this country can afford to let insects and plant diseases destroy millions of dollars' worth of food, timber, and other resources. This will not always be so. In the future we may face our greatest challenge. New tillable lands are no longer available to increase food production to feed a rapidly expanding population. While increased yields through improved varieties and fertilization will be able to provide part of the increase needed, we as biological scientists will be called upon to further reduce the losses to insects and plant diseases if we are to continue as the best fed Nation in the world.

If we are to be successful, we have an immediate contribution to make. Even now many people are frightened with regard to the use of pesticides. We must by intelligent direction of our plant protection programs, and by supplying growers with safe and effective control recommendations, regain the confidence of the public. We must shift the emphasis from the fears of pesticides to one of concern that these materials may not be adequate to insure enough food for 350 million Americans in 2000 A.D.—just forty years from now.

Entomological Contributions to Human Welfare

Through Plant Quarantine

By HORACE S. DEAN

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I shall speak on the subject of plant quarantine contributions to human welfare since a typical plant quarantine inspector works in the fields of applied phytopathology and nematology as well as in the field of applied entomology. He must know something of mites and snails as well.

By "plant quarantine," I am referring to a function of government,—protection against plant pests. Unless the context indicates otherwise, my remarks refer to the work of the Plant Quarantine Division of the Agricultural Research Service, U. S. Department of Agriculture. Other speakers on this program are discussing other phases of quarantine.

Numerous estimates have been made of the average annual losses in this country from pests and diseases of animals and plants. When weeds are included they are as high as $10 to $15 billion. Disease damage to crops has been placed at $3 billon and insect damage at $4 to $5 billion annually. Others speak in terms of $10 billion annual loss from pests and diseases of animals and plants. The importance of preventing the introduction of additional foreign plant pests is indicated by these large figures as a base. They also answer the question "Why plant quarantine?" Keeping additional foreign pests from adversely affecting our economy and welfare is the basic function of the Plant Quarantine Division.

How does plant quarantine contribute to human welfare? It operates under authority of the Plant Quarantine Act of 1912, as amended, the Mexican Border Act of 1942, the Federal Plant Pest Act of 1957, and related legislation. A force of about 500 professionally trained employees inspects incoming carriers (i.e., vessels, vehicles, and aircraft), their stores and cargo, baggage, and mail for pests and unauthorized materials, and examines imported plant materials, and soil for plant pests. Treatment or other disposition is required in case pests of significance are found. A similar program is concerned with traffic from Guam, Hawaii, Puerto Rico, and the Virgin Islands of the United States to the con-

tinental United States. The importation and interstate movement of plant pests as such is regulated to prevent their harmful dissemination. Through inspection of freight, express, and parcel post at strategic traffic centers in the continental United States, assistance is rendered in the enforcement of the continental Federal domestic quarantines and the State quarantines and nursery stock regulations. These latter are also for the purpose of controlling plant pest spread. Plant quarantine also assists producers and exporters of U. S.-grown plants and plant products by inspecting and certifying them for export in accordance with the phytosanitary import requirements of the countries of destination.

What has plant quarantine done to contribute to the welfare of people in the United States? Just a few figures to partially answer that question. Last year it inspected 139,415 aircraft, 60,394 vessels, 82,815 cargo importations of plant material, 22,656,765 vehicles from Mexico, 22,025,193 pieces of baggage, and 37,903,668 mail packages. The 500 inspectors had assistance in this activity to which we will later refer.

What did this effort accomplish? Last year, an average of approximately 860 lots of unauthorized materials subject to plant quarantine restriction were intercepted each day. A pest of plant quarantine significance was intercepted at the rate of each 17 minutes last year.

How important are these interceptions? Take the khapra beetle. Should it become firmly established in the nation's food-storage and distribution systems it would add enormously to that $7-10 billion annual loss we mentioned. Last year plant quarantine inspectors found it 129 times in ships' stores, holds of vessels, and with cargoes; it was found once in an airplane and one time in a parcel post package.

The Mediterranean fruit fly, to name one of the world's worst fruit pests that fortunately we do not now have in the continental United States, Puerto Rico, or the Virgin Islands, was taken at quarantine 173 times. To name a few other notorious pests, the inspectors found the Mexican fruit fly 170 times, oriental fruit fly 10 times, olive fruit fly 52, West Indian fruit fly 120, black spot of citrus 109, citrus canker 739, cancrosis-B 8, Chilean grape mite 41, golden nematode 19, Mediterranean land snail 75, sweet orange scab 97, Yanone (Japanese citrus) scale 313. There was a 31.5% increase in pest interceptions over the previous year.

Since advances in human welfare are so largely dependent upon scientific research, let us here record that plant quarantine has made many contributions to the total knowledge of plant pests. On the basis of pests collected by the inspectors and submitted to research specialists, many new species have been described; new geographic and host records have been established; and the taxonomic position of others has been clarified by redescriptions, sometimes for a group as high as the family. In a few instances inspectors with adequate training in taxonomy have authored the descriptions for publication.

The relationship between plant quarantine and research is not onesided. Plant quarantine is given assists in numerous respects by research workers,—by taxonomists who identify pests and furnish distribution records, by the other workers who develop safeguarding procedures and advise in their uses, and in various other ways. These assists began with organization of the national U. S. plant quarantine effort and continue to this very moment. The rapport between research workers and the plant quarantine organization was never better. Plant quarantine confidently faces the new problems in plant protection secure in the knowledge that the partnership with research will continue and that, as the need arises, new procedures and improved techniques will be provided.

A recent and out-of-the ordinary example of research assists can be cited thus: As working tools for inspectors, plant quarantine develops technical manuals on various subjects. A recent contribution is a "snail manual" entitled "Some Snails and Slugs of Quarantine Significance to the United States," by John B. Burch of the University of Michigan. This discussion of diagnostic characters with useful drawings has created a demand for this helpful guide from many others in the pest control field in addition to the needs of the Division personnel.

Plant quarantine, to be biologically sound, must be based upon the best possible information as to pest distribution, both as to hosts and geographically. In many instances adequate information is lacking. Surveys abroad by competent personnel have on occasion supplied that lack when agreeable to the governments of the countries in which made. The results have been contributions to scientific knowledge. Further contributions have been made in recent years through the training of young nationals in survey techniques through their association with the U. S. personnel during the survey.

Plant quarantine contributions have been made to human welfare abroad as well as at home. The idea of plant quarantines is not new. An early approach to plant pest protection through a quarantine-type of action was taken in 1726 by the Connecticut government when a law was passed for barberry extermination and to forbid its planting on account of what we now know as the stem-rust of wheat. The modern international approach to the problem of preventing the movement of plant pests across international frontiers is represented by the International Plant Protection Convention to which many nations of the world subscribe. During and immediately following World War II representatives of the Plant Quarantine Division, in association with far-sighted workers in military and other civil U. S. agencies, and with workers in other countries who were concerned about the problems caused by the dissemination of pests internationally with wartime movements, endeavored to restore and strengthen the plant quarantine safeguards destroyed or disrupted by war. There followed the erection of the International Plant Protection Organization and the development of the Convention of 1951. A model international phytosanitary certificate was drafted which serves most effectively today. A representative of plant quarantine on the U. S. delegation, along with a representative of Canada and another of the United Kingdom, was largely responsible for the language of that certificate which now has wide-spread acceptance. This is a major contribution. The U. S. representative was none other than E. R. Sasscer who served with distinction as President of the American Association of Economic Entomologists in 1939. He was, in fact, the first Plant Quarantine Inspector of the Department.

Plant quarantine in the United States, a federal governmental function for nearly 50 years, has been conducted on the basis of biological necessity. We have resisted pressures to promulgate quarantine import restrictions for other than the sound purposes of preventing injurious foreign plant pests from entering and becoming established in this country. It has long been the goal of plant quarantine to provide improved protection with a minimum of trade interference; to make adjustments to new methods of international transportation; and to bring about a new era of international relationships in this field. At the same time, since the service to exporters was first authorized in 1926, plant quarantine has aimed at a high standard of inspection and certification of U. S.-grown plant materials offered for ex-

port and to make the certification meaningful to the phytosanitary services of the receiving countries.

Although inspection and certification for export is not mandatory for shipments from this country, it is widely used because the certificates are usually necessary for importation abroad. We have isued over 53,000 certificates in a single year covering as little as a single plant or bulb to large commercial shipments measured by car-loads. The certificates covered 25 million containers in that year. To do this work intelligently requires up-to-date information as to the phytosanitary import requirements of most of the countries of the world. Plant quarantine maintains summaries in English for about 125 countries and these are available upon request. These summaries are approved by competent authorities of the countries concerned. Although designed to reflect the conditions affecting imports of American materials, the requests received from abroad for the summaries indicate another worthwhile contribution to international quarantine efforts.

To accomplish these goals has meant the development of an especially trained corps of biologists. Several nations newly conscious of the need for plant quarantine in their countries—or of improving their existing plant quarantine systems—expressed an interest in studying U. S. plant quarantine policies, programs, and above all —our methods of training biologists for careers in plant quarantine. Arrangements were made to accept a limited number of officials of other countries, selected through the foreign aid program, for instruction in plant quarantine at the Plant Quarantine Division's Training Center in New York.

During the eight years this course has been available, 81 such foreign trainees have taken advantage of this opportunity for the full three-months' course. Short course trainees have numbered 63. Forty countries have been represented by these trainees. Many have been successful in making biologically sound plant quarantine more effective in their own countries following their return to their homelands. This is a major contribution to the protection of the world's agriculture from needless loss due to pests. As a by-product of this program plant quarantine has received new and important pest distribution records from some former trainees, thereby adding to our sum of scientific knowledge.

The enormous growth in international civil aviation since World War II created many unprecedented problems for the governments and industry concerned with this form of transportation. Plant quarantine recognized from the beginning of the industry that air transport provided a new and excellent avenue for plant pest dissemination. In post war international meetings specialists in border clearance formalities, representing many countries, developed simplified procedures for facilitating the movement of aircraft, their crews, passengers, stores, baggage, mail, and cargo over national boundaries. Industry cooperated. The goal has been to retain the advantage of speed inherent in aerial transportation and the safeguards essential to the health, welfare, and security of the nations concerned. The U. S. Department of Agriculture's quarantine representative at the meetings was, at first, the only professional agricultural quarantine worker present. As he injected a consideration of means to prevent international dissemination of plant and animal pests into the deliberations, other nations took notice. Some nations have since given important support to this effort in subsequent meetings. The seed thus planted some years ago will, we confidently predict, be regarded as another major contribution of plant quarantine.

The principle of predeparture or point of origin clearance is neither original nor exclusive with plant quarantine. In 1948, however, plant quarantine suggested through official channels to the nations engaged in civil air transport that "Contracting States should make arrangements whereby one State will permit another State to station representatives of the public authorities concerned in its territory to examine aircraft, passengers, crew, baggage, cargo, and documentation for customs, immigration, public health, and agricultural quarantine purposes, prior to departure for the other State concerned, when such action will facilitate clearance upon arrival in that State."

The proposal was accepted world-wide as a recommended practice. The clearance of air borne passengers for non-stop commercial flights to the United States is now conducted by U. S. Immigration, Customs, and Agricultural Quarantine in Nassau, Bahama Islands, and in Bermuda. Customs and Immigration, also looking after Agricultural Quarantine interests, conduct a similar service at several points in Canada. This is a contribution to public convenience as well as being good plant quarantine practice.

Plant quarantine could make that proposal because of its experience since 1937 in preclearing for plant quarantine purposes the air passengers departing from Honolulu for the mainland. The convenience of the practice to the travelling public and its effectiveness as a quarantine procedure brought its extension in 1949 to traffic from Puerto Rico to the mainland. Plant quarantine began, in 1951, without additional cost to the U. S. taxpayer, the inspection and release of flowering bulbs in the Netherlands rather than upon arrival at a U. S. port of entry. This is an advance in plant quarantine practice as well as a contribution to the industry which depends upon these bulbs for the U. S. trade. That procedure has since spread to certain bulbs grown in Belgium, France, Italy, and West Germany.

A moment ago I cited statistics to show the accomplishments of plant quarantine during the past year. Is it possible that the 500 inspectors alone can inspect all those aircraft, vessels, automobiles, baggage, cargo, and mail? Obviously, the answer is "no." The inspectors' hands also have to be multiplied at the ports of entry. Personnel in Customs, Immigration, Public Health, the Postal Service, the Armed Forces, Animal Inspection and Quarantine, Agricultural Marketing Service, State regulatory services, the transportation industry, city officials, port authorities, custom brokers, labor, and others, including some members of the general public collectively give plant quarantine valuable assists each and every hour of the day and night.

The greatest force for enhancing the effectiveness of plant quarantine lies in the support of the American public. Many scientists, nurserymen, and others, singly and as representatives of various professional and trade organizations have long recognized the need for protection against the introduction of destructive foreign plant pests and supported the plant quarantine effort in a diversity of ways. More recently there is evidence that the travelling public generally is awakening to the need for preventing the entry of additional pests of field, forest, and ornamental crops and the part it can take in the preventive effort. But not until the vast majority of travellers, importers, and carriers actively participate in the effort will plant quarantine have the support it needs to make the ever increasing commerce and travel reasonably secure against entry of pests inimical to our farms, forests, and gardens. The daily interception rate of 860 lots of unauthorized materials subject to plant quarantine restriction and the interception of a significant pest every 17 minutes suggests that until the public as a whole actively participates, the risk of pest entry will grow as traffic and travel increases. Plant

quarantine, with assistance from other Federal and State agencies, various industry segments, and many others, is actively engaged in bringing the need for plant quarantine to the attention of the traveller who can participate by leaving unauthorized agricultural materials behind when he comes to this country. Our approach to the American traveller is through the press, radio, TV, movies, signs, and brochures. The foreigner coming to our shores will be exposed to a measure of this information but he is not as readily reached. Comparable approaches are being made to carriers and industries.

Meanwhile, plant quarantine, in order to continue to give protection against pest entry, must find ways to meet the challenge of the continually increasing traffic with a well trained and adequate staff at all ports where the traffic and pest risk justifies, with newer and better methods of safeguarding existing traffic and minimizing interference with commerce, and with new procedures and techniques to meet the problems of tomorrow that are unknown today. Plant quarantine, with public support, must defend successfully against the efforts of those few who, for reasons of their own, would minimize or abolish effective phases of the program, or who would have quarantine impediments to commerce imposed for reasons more economic than biologic. Plant quarantine has met many challenges in the past, it is meeting them today, and, with public understanding, support, and participation, you can expect it to continue to make its many and varied contributions to the welfare of future generations.

I conclude with the thought that the full measure of the contribution of plant quarantine to human welfare will, in final analysis, be the measure of public awareness of the need for, and support of, the program and its active participation in making that program effective. May we count on your help to tell the plant quarantine story?

Entomological Contributions to Human Welfare

Through The Public Health Service

By JOHN H. HUGHES

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It would be difficult to discuss Public Health Service contributions of an entomological nature without commenting briefly on the Service itself, which came into existence in 1798, and whose responsibility was to give relief to sick and injured sailors and merchant seamen. Undoubtedly, some of the illnesses treated resulted from arthropod-borne diseases of the time, such as yellow fever and malaria. These diseases and others involving arthropods in their transmission played an important role in the development of the Service. Even today, all but one of the six quarantinable diseases of concern to international traffic and to health departments around the world involve insects in their transmission.

Although professional entomology in the Federal Government dates back to 1854 (*1*)[1], entomology as a profession in the Public Health Service did not come until recent years. In fact, L. O. Howard in 1921 stated that as late as 1871 there was no mention made in any of the standard medical references that any specific disease might be transmitted by insects (*2*). Nevertheless, it was only a short time after this that the Public Health Service started working on arthropod-borne diseases and, unwittingly, on entomology.

In the spring and summer of 1878, a yellow fever epidemic occurred with devastating results. It was estimated that economic losses to the United States from this epidemic, which particularly affected the Mississippi Valley, amounted to $175,000,000. This did not take into account property depreciation and future damage to commerce at a port such as New Orleans. Also, it was estimated that there were 25,000 cases of yellow fever with a loss of human life totaling 4,500 (*3*). During the winter of 1878, in the wake of the great yellow fever epidemic of that year, an Act was passed by Congress, providing for measures specifically for the prevention of introduction of infectious or contagious diseases into the United States (*4, 5*). Later, an Act of 1893 (*6, 7*), sometimes referred to as the "Basic Organic Quarantine Act," gave authority for all present quarantine regulations of the Service, thus making possible for the first time application of organized federal quarantine measures to insure against the importation of infectious diseases and their spread in this country.

The year 1878 was one of profound significance to medical entomology. Patrick Manson (*8*) made the initial discovery of the presence and development of the causative agent of Bancroft's filariasis in a mosquito, thus unlocking the door to great advancements in arthropod-transmission of disease. The date 1878 is often used as the beginning of medical entomology. However, it was not until the work of persons such as Smith and Kilborne (*9*) of the Department of Agriculture in 1893 on tick transmission of Texas fever in cattle, Ross (*10*) of England in 1897-1898 on the transmission of malaria by a mosquito, and Simond (*11*) of France in 1898 on the demonstration of transmission of the plague bacillus by the rat flea, that disease vector control could be approached objectively. Hence, the real beginning of medical entomology as a scientific discipline was at the close of the nineteenth century.

In 1879, the year following Manson's discovery, an event occurred which was to carve an important niche in public health and contribute immeasurably to medical entomology. Henry Carter, physician and engineer (*12*), entered the Public Health Service that year. Dr. Carter was to make valuable contributions in epidemiology, including his important discovery (*13*) which he called the extrinsic period of incubation of yellow fever.

The Quarantine Service was active during the period following the quarantine legislation of 1878 handling ships and persons entering United States' ports from foreign countries where yellow fever occurred. Carter (*14*) described some of his personal observations on work accomplished on vessels arriving in the South during the period 1888 to 1891. He stated that vessels were capable of carrying yellow fever infection and made ref-

[1] See References Cited. Numbers used to conserve space.

erence to control measures applied. These measures included washing walls, ceilings, and floors with mercuric solution, and fumigation of the ship by burning sulphur. At least some control of the then unknown vector, *Aedes aegypti*, resulted from the measures applied on shipboard, although they were actually directed toward destruction of any causative agent in the environment (*4*).

Prior to 1920, a preponderance of the workers in the Public Health Service engaged in finding solutions to problems involving medical entomology were physicians who seem to have found the work fascinating and often highly rewarding. The latter opinion is given support by an editorial in the *Journal of the American Medical Association* (*15*) in 1915, which stated that "Among the brightest pages of the history of American medicine are those recording the work of American scientists on the part played by insects in the transmission of disease."

Apparently, the first professional entomologist associated with the Public Health Service was L. O. Howard of the Department of Agriculture who was appointed on a consultant basis at the turn of the century (*16*).

Regardless of the scientific disciplines involved in work on entomological problems, it is noted that definite progress was made by about 1920 in developing medical entomology in the Public Health Service. Also, by that time a few, highly competent, professional entomologists were being employed on a full-time basis in the Service to work on malaria, Rocky Mountain spotted fever, and other arthropod-borne diseases.

Some Arthropod-Borne Diseases: Yellow fever, malaria, plague, typhus, and Rocky Mountain spotted fever made indelible impressions in the annals of medicine and public health in this country. Particular attention will be given to these arthropod-transmitted diseases here. Consideration will also be given to some of the Public Health Service workers and their accomplishments in connection with these diseases, However, the writer is cognizant of achievements by others in the struggle against these and related diseases.

Yellow Fever and Control: The list of workers in the Public health Service who contributed toward finding a solution to the historic problem of yellow fever must be headed by Henry R. Carter. As previously suggested, it was the painstaking work of this outstanding Public Health Service Medical Officer that culminated in 1898 in his discovery of the "extrinsic" period of incubation of yellow fever (*13*). This discovery served as an aid to Walter Reed in his search in Cuba for a solution to the yellow fever riddle. Further, it served as a model to others who pursued studies on additional arthropod-borne diseases.

Dr. Reed in 1900, on giving reasons (*17*) for pursuing the theory of propagation of yellow fever by the mosquito as advanced by Carlos Finlay in 1881 (*18*), stated that he was impressed by the valuable observations made by Dr. Carter of the Public Health Service during 1898 in Mississippi as reported in the paper, "A note on the interval between infecting and secondary cases of yellow fever. . . ." Dr. Reed expressed the opinion that insufficient importance was placed on Dr. Carter's "painstaking and valuable data."

The work of Dr. Reed brought to a realization for the first time the fact that to eliminate yellow fever it was necessary only to eliminate the mosquito vector. Gorgas (*19, 20*) of the United States Army, set the control pattern in 1901 by freeing Havana of yellow fever in less than a year.

The Public Health Service took immediate action in adopting the experience of Gorgas. In New Orleans in 1905, during the last yellow fever epidemic in this country, an extensive anti-mosquito campaign was carried on. The success of the New Orleans campaign was attested by L. O. Howard (*2*) who stated that the results following initiation of the mosquito control campaign in New Orleans were striking. He compared the 1905 epidemic (3,404 cases with 452 deaths) with an earlier epidemic (*3*) which occurred in New Orleans in 1878 (estimated 25,000 cases with 4,500 deaths) and concluded that the use of anti-mosquito control measures saved at least 4,000 lives.

Although yellow fever in epidemic form has not recurred in the United States following its onslaught on New Orleans in 1905, a constant vigilance has been maintained to prevent its reintroduction. Twenty-six cases of yellow fever were reported in this country during the period 1907 to 1924. Twenty-three of these were intercepted on ships in international quarantine (*21*). Undoubtedly, the quarantine efforts were of value in preventing spread of the disease in the seaport areas involved.

Yellow fever has provided one of the richest chapters in medical and public health history. Many valuable lessons in epidemiology and disease control were learned through experience with it.

Malaria Control: Another disease, once prevalent in most of the United States and currently of great importance in many parts of the tropics and subtropics, is malaria. Many Public Health Service workers contributed to its understanding, including Dr. Carter, whose name was mentioned in connection with yellow fever. Carter in 1914 (*22*), and Carter, Le Prince and Griffitts (*23*) in 1915, conducted important studies on the effect of large bodies of impounded waters in the South on the production of malaria. They enumerated methods by which anopheline breeding could be prevented, including manipulation of the water level and elimination of organic debris which served as protective shelter for *Anopheles quadrimaculatus*. The first attempt to control disease-bearing insects in the United States, other than in a few scattered epidemic cities, such as New Orleans, was attributed to Carter (*24*) who conducted malaria surveys in Virginia and North Carolina in 1913. In 1919, Carter (*25*), reviewing the problem of malaria in the Southern United States, referred to it as being the most important tropical disease because it seriously affected enormous numbers of agricultural and industrial workers by lowering their efficiency.

J. A. Le Prince, a sanitary engineer, who had rich experience in mosquito control work with Gorgas in Cuba and Panama (*26, 27*), entered the Public Health Service in 1914. In the absence of effective insecticides, Le Prince employed practical measures such as those used in Cuba and Panama. One malaria control technique which he described (*28*) was the destruction of engorged adult female anopheline mosquitoes. This mechanical method accomplished malaria control in a manner somewhat comparable to the more recent residual insecticide programs by destroying mosquitoes which had fed on humans and which may have become infected with malaria parasites.

Some of the early studies on the flight range of *Anopheles quadrimaculatus* were made by Le Prince and Griffitts (*29*) in 1916. Le Prince and Johnson (*30*) in 1928 designed a power dusting apparatus which could be mounted on a small boat and used effectively and economically in applying Paris green to lakes and other bodies of water as needed in controlling anopheline mosquitoes.

Malariology owes a debt of gratitude to the late M. A. Barber, who made valuable contributions to the knowledge of malaria and its control. Barber looked for a mosquito larvicide that was less expensive and more toxic to anophelines than anything known. His experiments

with arsenicals during the early 1920's resulted in the important discovery of Paris green for control of anopheline larvae (*31*).

During 1923 and 1924, King and Bradley (*32*) of the Department of Agriculture, the latter who was to enter the Public Health Service, made an important advancement in insecticide application when they effectively applied Paris green on anopheline-breeding lakes by means of an airplane. This method of applying insecticides met with favor here and abroad.

Malaria control in the United States also owes much to L. L. Williams, Jr., who has spent most of his life planning and working toward the elimination of malaria from the United States and abroad. As early as 1937 he outlined plans for control of malaria on a state-wide basis (*33*). The scope of the malaria problem facing this country at that time was revealed by Dr. Williams when he commented on its economic importance (*34*), stating that an estimated average of 4,000,000 cases of malaria occurred in the South each year, with 4,000 deaths. By using some of Carter's studies as a basis, Dr. Williams in 1943 estimated (*35*) the average annual loss in the United States at about $500,000,000.

Dr. Williams was largely responsible for the organization of the Malaria Control Activities in War Areas (MCWA) program of the Public Health Service in March 1942. He attracted to that program outstanding scientists, including George H. Bradley, Justin M. Andrews, Stanley B. Freeborn, and S. W. Simmons.

The story of malaria control in the United States by the Public Health Service in cooperation with State Health Departments is one of success. Endemic malaria disappeared under the well-planned program of the Service. There are few, if any, indigenous cases of malaria here today. In the struggle against this disease, human welfare has benefited immeasurably from this achievement in Public Health Service entomology.

Plague: Another disease that has profoundly affected civilization is plague, a very old and important flea-borne (*11*) disease, known as the "Black Death" in the Middle Ages. This disease, always closely associated with commerce along trade routes of the world, has occurred in pandemic form at least four times during the past 1,500 years and has been responsible for many deaths (*36, 37*).

The first proven human case of plague (bubonic) on the continent of North America occurred in San Francisco in March 1900 (*38*), probably imported from the Orient. However, Kinyoun (*39*), a Public Health Service officer assigned to the quarantine station there was of the opinion that this disease was present as early as November 1898, based on clinical notes available to him. The initial San Francisco case was followed, in 1901, by an outbreak of 121 cases with 118 deaths (a case fatality of 97.5 percent). Other outbreaks occurred in the South and West as late as 1924 (*40*).

There was much activity in health agencies in the United States following the reporting of plague in San Francisco. The Public Health Service quarantine stations, the Plague Laboratory, and the Hygienic Laboratory carried on extensive research on the disease and applied rodent- and flea-control measures in international and coastwise shipping traffic for its control.

Human plague in the United States was prevalent from 1900 until about 1925. Since then comparatively few human cases have occurred. However, the disease is established in wild rodents where it continues to serve as a threat to public health.

Typhus: Epidemic typhus fever, borne from man to man by the body louse, *Pediculus humanus humanus,* has been of great concern in many parts of the world for centuries (*41*).

Typhus has occurred in this country on a number of occasions in epidemic form. It has been an important subject, especially in Public Health Service Quarantine activities. Programs to prevent its importation, with emphasis on louse control (*42, 43, 44*), were developed and carried on at quarantine stations while the disease was considered a serious threat.

The last outbreak of louse-borne typhus in this country was in 1920-1921 on the San Juan Indian reservation of the Southwest. This epidemic consisted of 63 cases with 27 deaths. It was investigated and brought under control by Armstrong (*45*), who effectively employed louse-control measures.

Although louse-borne typhus is no longer considered a serious threat to this country, measures are applied along the Mexico-United States border to one-fourth million or more Mexican Nationals each year in connection with a Farm Placement Program under the direction of the Department of Labor (*46*).

Prior to work published in 1926 by Kenneth F. Maxcy, a Service Medical Officer, it was rather generally accepted here that a mild form of typhus present in this country was the same as louse-borne or epidemic typhus. Actually, it was commonly believed that lice were entirely responsible for transmission of the causative agent of typhus, whether mild or severe. Thus, the saying "no lice, no typhus" seemed appropriate. This belief was modified when Maxcy made careful clinical studies of mild typhus in the South and concluded that it was an endemic form (*47*) which could not be distinguished clinically from mild louse-borne typhus. In later studies, Maxcy (*48*) observed that this mild, endemic form of typhus, presently known as murine typhus, was occurring in the absence of lice and was not necessarily imported from outside the United States. He suspected the rat as being the reservoir for this endemic disease and thought an arthropod vector other than the louse might be involved in its transmission. Maxcy's work has served as a model for others investigating typhus (*49*). Dyer and co-workers in 1931 (*50, 51*) showed that this form of typhus could be transmitted by the rat flea, *Xenopsylla cheopis,* from one rat to another and that the virus was often present in feces of infected fleas.

Rocky Mountain Spotted Fever: The important chapter on Rocky Mountain spotted fever that has been written into Public Health Service history, actively involved entomologists, epidemiologists, and others.

In the summer of 1906 Walter King (*52*) of the Public Health Service and H. T. Ricketts of the University of Chicago (*53*) demonstrated a tick to be capable of transmitting the causative agent of Rocky Mountain spotted fever. C. W. Stiles (*54*), a Zoologist of the Service, named the tick *Dermacentor andersoni* after John F. Anderson who, in 1903, described Rocky Mountain spotted fever as a new disease (*55*) and discussed the probability of the tick as the vector responsible for its transmission.

One cannot discuss ticks without mentioning Robert A. Cooley, an entomologist who came to the Public Health Service in 1931. His excellent work on Rocky Mountain spotted fever and on the Ixodidae (*56*) is well known.

The Public Health Service was fortunate indeed when, in 1921, it acquired the services of R. R. Parker. Dr. Parker was among the first entomologists employed full time by the Public Health Service. His initial undertaking at the Rocky Mountain Laboratory was on Rocky Mountain spotted fever. Dr. Parker studied ticks in

relation to transmission of spotted fever and other tick-borne infections. He worked in close collaboration with R. R. Spencer in exploring various aspects of Rocky Mountain spotted fever and in developing a vaccine effective in the prevention of the disease in man (*57*). As director of the Rocky Mountain Laboratory from 1925 until his death in 1949, Dr. Parker planned and guided numerous research activities, many of entomological nature.

Other Diseases: Five of the most important arthropod-borne diseases that have occurred in the United States have been considered. Of course many others involving arthropods in their transmission have been in this country or are here now. These include the encephalitides, tularemia, dengue, rickettsialpox, tick-borne relapsing fever, and filariasis, none of which will be considered in this paper.

Current Entomology Programs: Comments made thus far have applied primarily to work of an entomological nature accomplished in the past. However, a variety of programs involving medical entomology are currently in progress in the Service.

The Division of Foreign Quarantine, the Communicable Disease Center, and the Rocky Mountain Laboratory have programs on various phases of medical entomology and related disciplines. These programs, planned and directed by professional entomologists, include activities varying from those of regulatory nature such as quarantine, to basic investigations on arthropod vectors and improved measures for their control.

Unfortunately, it is not possible at this time to elaborate on the current entomology program. It may be stated, however, that the science of entomology is being given a reasonable opportunity to make its contribution to human welfare and that it is meeting its challenge.

Summary: Arthropod-borne diseases and medical entomology have played an important role in the development of the Public Health Service.

Studies on the transmission and control of yellow fever, malaria, typhus, plague, and other insect-transmitted diseases were given prime consideration by the Service, particularly following enactment of legislation in 1878, providing for measures of control against the importation and spread of infectious or contagious diseases.

Medical entomology in the Public Health Service was handled almost entirely by the medical officer until about 1920, when professional entomologists were recruited. Today, the Service has a substantially large corps of professional entomologists engaged in planning and conducting important programs in medical entomology.

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Entomological Contributions to Human Welfare

Through The State

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Introduction: Insects have inhabited the earth for over 250 million years—in contrast to man's mere one million years of existence. Their amazing adaptation to life under varied environmental conditions has made them dominant in the animal kingdom as it pertains to species variation, total number and world-wide distribution. Numerically, insects comprise 75 percent of all living animals and collectively outweigh all other animal life.

Man, as an interloper, has had to come from behind in competing for favorable habitat and food supply and has had to battle constantly to protect his squatter's rights. In fact, the insect challenge became increasingly significant as man made changes in his habits and in his surroundings. As human populations increased and crowded into villages and cities, insect ectoparasites and insect-borne diseases ran rampant. The domestication of animals led to comparable problem areas. Centralized food storage fostered the build-up of an entire new series of pests while the diversification and concentration of planted crops was a boon to insect population explosions.

The conflict of interests between man and insects continues unabated. It is fortunate indeed, that so many insects are either beneficial or of no consequence to man's general livelihood. If it were not for the fact that less than one percent of all species are considered detrimental to his well-being, the war against the enemy element might well be a losing one. Nonetheless, odds in favor of the insect, popularly quoted as 500,000 to one, are indicative of battles yet to be won. Despite man's many conquests over the years, and we are seeing some phenomenal successes today, the entomologist still has great respect for his rugged, resistant and resilient adversary and does not claim that a panacea is within his grasp.

From a State viewpoint entomological contributions to human welfare encompass the entire field of endeavor, ranging from basic research, legislation and regulatory activities, medical, veterinary and forest entomology, extension and teaching to economic entomology at the commercial level, including the varied specialities inherent to each such grouping. It is estimated that there are some 4,500 professional entomologists in the country, 1,000 employed by industry; 500 in the U. S. Department of Agriculture; 500 in colleges and experiment stations; 100 in public health; 100 in the armed services; and 2,300 in state and county regulatory agencies, private pest control, teaching and consultant capacity.

Let me say at this point that our war with the insects is everyone's battle and while I speak from a state viewpoint I wish to emphasize that the state, as a single entity, could not win on its own, nor can any other agency, public or private. Thus, fundamentally, the state viewpoint is one of integrated cooperation between all forces. Many entomological contributions to human welfare that may have been credited to a given agency would not have been possible without the many hidden collateral contributions of science, industry and the ever-loving taxpayer.

Research: Basic entomological accomplishment stems from the many laboratory and field studies which have developed the biological concepts essential to fruitful application. Without this background of research, entomological endeavor is reduced to medicine man, cure-all, wing and a prayer status. Early sorties against the insect enemy employed such feeble weapons as sage, wormwood, salt, vinegar, urine and dung. Only in the last 75 years has true progress in applied entomology been made.

Fortunately the basic fundamentals of insect taxonomy had already been developed to a remarkable degree, this branch of the science relatively ready and waiting for the call from applied entomology. In insect identification we have the starting foci for all subsequent investigation and recommendation. Here too, however, advancements are being made that further contribute to the services rendered. For example in California we have long puzzled over the relationships between fruit fly populations in native bitter cherry and those in cultivated host trees, populations exhibiting no morphological differentiation. Comparable problems exist in the identification of apple, blueberry and snowberry maggots. New techniques for studying chromosomal arrangements in live cellular tissues, and thereby identifying species, may well provide the answers needed here.

The use of chemicals to combat insects is a development credited to the last quarter of the 19th century. This era of the arsenicals, botanicals and oils was not replaced until the mid-1940's when the chlorinated hydrocarbons, later phosphorus compounds and others, offered greater selectivity of action. Concurrent changes in the last decade have occurred in the physiological action and in the use of certain chemicals; with systemic poisons, growth hormones, attractants and repellents, granular formulations, desiccants and defoliants along with major changes in methods of application all entering into the picture.

Pesticide usage in the United States is estimated to cost one-third of a billion dollars annually. The growth of this industry is apparent. For example, pesticide production estimates were 75,000 tons in 1944 as compared with 250,000 tons ten years later. Over 10 million acres are now treated for general pest control in California, half this acreage by means of aircraft as compared with two million acres so treated ten years earlier. It is estimated that 40-50 percent of the increase in our agricultural production since World War II has been due to the use of agricultural chemicals. Without pesticides or other controls the commercial production of many fruits and vegetables would be impossible. None of us can envisage an apple or an ear of corn free from "worms", were it not for effective controls.

Problems of continuing concern in the effective use of chemicals include such fields as insect resistance, phytocidal effects, compatability, selectivity of action, residual effects on man and warm-blooded animals, and, we might add, public opinion. For example in California, DDT for a full decade, has been applied to an average of 200,000 acres of rangeland annually in the control of the migratory beet leaf-hopper. This year it was necessary to adjust operations so as to employ the substitute material, malathion, in nearly one-half the area where close association with croplands presented a drift contamination problem.

Other major accomplishments in the realm of insect control have been equally significant and even more popularly received. The biological control of insect pests was first placed upon a commercial basis in California. From the parasite-predator work of 65-75 years ago in connection with cottony-cushion scale to the recent spotted alfalfa aphid problem, many great stories of such success can be cited. Initial crop losses and control costs, exceeding 12 million dollars, were attributed to spotted alfalfa aphid attack in California. Parasite establishment and integrated control pratices have since reduced these losses by nearly three-fourths. Of the more than 400 species of beneficial insects that have been introduced into this country, about 100 are doing an effective control job.

The release of male populations, made sterile by irradiation or chemical means, to initially dilute, reduce and eventually prevent all fertile development, is a truly momentous channel of endeavor. The application of these principles in seeking the eradication of screw-worm in the south has been followed by studies seeking use of the same techniques in connection with fruit flies and other insect pests.

Commodity treatments, resistant or tolerant plant varieties, attractants and repellents, growth hormones and many other lines of research investigation hold promise for future advancements in the control picture.

Quarantine: Professional entomology in the United States dates back more than a hundred years to the appointment of the first federal and state entomologists. Subsequently California inaugurated the practice of employing legal means to prevent the introduction, establishment and spread of serious insect pests within its confines. Work of the Board of State Viticultural Commissioners, created by legislative act in 1880, led to the first State quarantine law of 1899 followed by the national Plant Quarantine Act of 1912.

The early introduction of such pests as the gypsy moth, codling moth, European corn borer, alfalfa weevil, Japanese beetle, Argentine ant and others gave ample evidence of the potentialities of foreign invaders. Over half of our major pests are of the introduced variety. Quarantine, our first line of defense, has since done a tremendous job of excluding a reported 20,000 pest species not known to occur in the United States. Less than 25 percent of all known introductions have occurred since the inception of the quarantine system despite tremendous increases in the volume and speed of commodity movement and tourist travel.

In California, federal, state and county agencies play major roles in plant quarantine enforcement. The more than 200 crops produced and the wide diversity of climate makes the State particularly vulnerable to introduced pests. On the other hand geographic barriers, which preclude natural spread and minimize the number of access routes open to man, foster the mechanics of quarantine action. Inspection services at twenty border stations, three major seaport facilities and numerous internal airport, mail and common carrier depots serve to guard the various avenues of entry. Over five million cars, buses and trucks, 10,000 vessels, 5,000 airplanes and 15 million people were checked in 1959 and nearly 100,000 lots of material determined to be in violation of quarantines. More than two million dollars are spent annually for quarantine enforcement in California. Yet if we recognize the three billion dollar annual cash value of California agricultural products, the ten million dollar cost of Mediterranean fruit fly eradication in Florida, or the annual losses and control costs that would accrue if additional major pests were allowed to run rampant, such quarantine expenditures can well be considered as cheap insurance.

Detection: We recognize that, despite the excellent record of our quarantine system, contraband material does occasionally find its way into our midst and may lead to the successful establishment of harmful pest species. Detection survey, serving as a secondary line of defense, has as its goal the discovery of incipient infestations of new pests. Federal, state and county agencies have banded together to foster the organization of detection search efforts and the improvement of reporting facilities. The California Department of Agriculture employs seven full-time survey entomologists and uses nearly 100 man-months of seasonal help in support of nearly two dozen specific detection campaigns carried on annually. This is done through and with various county departments of agriculture, the local agency carrying the greatest workload. Three specimens of Oriental fruit fly were recently trapped as a result of this state-wide program.

On the other hand we recognize that the detection of new pests is everyone's business, the experiment station specialists, the county agent, the commercial man, the farmer and the general public. We have many concrete examples of such active participation, and can only conclude that millions of interested eyes are more capable than a few thousand trained ones.

It has indeed been rewarding to note the response of the layman to recent Oriental fruit fly publicity in California. One publicity approach was aimed at soliciting public observational help and cooperative support to the effect of making everyone a participant in the program. Although letters, telephone calls, yard calls and the like are time consuming, and crane flies, bumble bees and Nitidulid larvae do not specifically contribute to the immediate goal, public association with the work has created an interest, an awareness and a sense of partnership in the program that a more factual approach would have failed to develop. We are convinced that such an informed public will be better equipped to understand and support our other activities as a result.

In the last decade more than two dozen insects new to the United States and nearly 300 new state records have been reported. Last year 10 new insects and 73 new state records were made. Many of these discoveries can be attributed to non-regulatory interests, hobbyists, farm advisors, research entomologists, industry people and others. The sorghum midge, khapra bettle, satin moth, Mexican bean beetle and other first records for California have been revealed through such channels.

Eradication: The tools provided by research play a major role in the direction of the regulatory activities that generally follow discovery of a new pest. Without them our efforts may be misdirected, futile or lead to any number of serious side complications, a system of trial and error that we can ill afford. I am reminded of two current program operations in California, the inception of one (khapra beetle), based on little or no background information, and the other (Oriental fruit fly), on an orderly, assured process, premised on very completed research study. When the khapra beetle activity was inaugurated in 1955, on an emergency basis, and the pressure for it was just short of terrific, the means for eradication had to be developed in the field on a progressive test case basis. Failures, errors, adjustments and the like were an integral part of the first two years of eradication effort. The favorable outlook we enjoy today was certainly reached the "hard way". In contrast, recent Oriental fruit fly finds have been taken in stride. The extremely potent lures for measuring the existence of infestation, poison feeding station and bait spray eradication techniques, and treatment measures to allow for commodity movement have permitted for a relatively simple A-B-C approach to the problem. Another such comparison might be made between the Mediterranean fruit fly eradication program in Florida in 1929 and that of 27 years later.

Successful eradication programs in California include those directed against the Mexican bean beetle, 1947-1956, a one-million dollar expenditure in protecting crops returning fifty million dollars annually; 35 outbreaks of citrus whitefly, 1907-1960; white snail in three counties, 1922-1949; parlatoria date scale, 1914-1936; obscure scale, 1933-1941; Hall scale 1934-1960; and other lesser undertakings.

Medical and Veterinary Entomology: The birth of medical entomology dates from the late 1800's and the discovery of the role of mosquitoes in the transmission of filariasis, malaria and yellow fever. Continuing investigations established the relationship of other insects and arthropods to human health. Bubonic plague, dengue, typhus and Rocky Mountain spotted fever are examples. As late as 1935 nearly a million cases of malaria, culminating in approximately 4,000 deaths, were reported in the United States, yet today, thanks to modern control methods, the disease is a rarity. Mosquito abatement districts in California have been particularly effective in protecting the public, not only from the nuisance aspect of mosquito attack, but from the serious encephalomyelitis virus for which one species is vector.

No wild or domesticated animal is free from external

or internal insect attack. Losses from cattle grubs and screw-worm alone in the United States are considered to range from 50-150 million dollars annually. A serious outbreak of screw-worm in the Gulf States, 1932-1934, resulted in the death of over 200,000 animals. A moment ago I mentioned the sterile-male release techniques employed to eradicate this pest. Great strides are being made in the conquest of other insects affecting the productivity of our livestock, poultry and other useful birds and animals.

Extension and Teaching: Through the Extension Service the results of entomological research are extended to apiarists, orchardists, produce growers, cattlemen and others. In California, farm advisors in 55 counties, and their staffs, aided by three extension entomologists, adjust new recommendations to the particular conditions that locally prevail. Field visits, meetings and printed matter are basic means of information distribution. Because of the close relationship between regulatory and advisory work, however, much of the burden of entomological advice rests with our local county agricultural commissioner offices. The extension man is indeed a trouble shooter, however ever ready to investigate, advise or develop the technical assistance necessary to solve a specific problem.

State agricultural colleges, authorized under the Morrill Act of 1862, and agricultural experiment stations, provided for by the Hatch Act of 1887, have provided a home base of operations for research, extension and academic operations. The University of California, with its 70 entomologists in academic status, provides both undergraduate and graduate work in entomology. Certainly the need for trained entomologists is so great that everything possible should be done to encourage entrance into this growing field.

Industrial Entomology: Industry research, including the development, screening and manufacture of new chemical compounds should not be underestimated. As much as a million dollars may be spent in readying a single product for the market. In California 8,000 pesticide compounds were registered for use in 1948; 14,000 in 1958. The place of our commercial pest control people including agricultural, structural, stored product, nursery and other specialty lines, is indeed important. They contribute a great deal in our war on insects. The team spirit and cooperative relationships between industrial, research, regulatory, extension and public health entomologists and the organizations they represent, is credited with much of the progress that has and is being made. In California an industry committee on insect contamination of foodstuffs has enlisted the aid of the Bureaus of Entomology and Vector Control who are collaborating in a qualitative and quantitative survey of Drosophila and Nitidulid breeding areas. Forest action councils are fine examples of such collaborative effort.

Summary: The world annually contributes an estimated 30 billion dollars in food and fiber to its insect enemies and this figure is highly conservative. Annual losses in stored products alone are equivalent to the quantity required for the subsistence level feeding of 130 million people. In the United States insect attack is credited with cash losses to crops, stored products and the health of man approaching ten billion dollars annually. Annual losses of 150-250 million dollars are attributed to boll weevil attack alone. It is estimated that some 88 million extra acres must be cultivated to offset the depredations of insects. Varying estimates have been made to the effect that our population may well double within the next 50 years. Current surpluses to the contrary—the outlook for the future, if it is to be a rosy one, hinges upon the provision of adequate food supplies to support such growth. Despite added acreage, new and more prolific plant varieties, superfertilizers, mechanization and other aids to production—we must keep pace with our insect problems or face the dire consequences that would follow. In reviewing briefly our entomological past and its contributions to human welfare we can be confident, working together, of our capacity for keeping pace and pulling ahead in the insect battle.

BOOKS AND JOURNALS FOR LATIN AMERICA

The U. S. Book Exchange is a nonprofit corporation that acts as a central clearing house for the exchange of books and journals between libraries all over the world. It also receives and distributes contributions from individuals. In a total membership of 2,500 libraries, 1,400 are in foreign countries—365 in Latin America. The stocks of books and journals in U.S.B.E. are large; more than one and a half million items are exchanged annually. However, requests often exceed supplies, particularly for scientific journals. The Pan American Union sponsors a program which is directed toward augmenting both the stocks of U.S.B.E. and the Latin American membership. Scientists of the U.S.A. are asked to donate to the U.S.B.E. files of scientific and technical journals which they no longer wish to keep in their libraries. The value of the gift plus the cost of mailing are income tax deductible. Latin American libraries are being informed of the services of the U.S.B.E. and urged to join and make full use of the opportunity. Further information about the program may be obtained from the U.S. Book Exchange, 3335 V Street, N.E., Washington 18, D. C., or from the Division of Science Development, Pan American Union, Washington 6, D. C.

SECTION A. JOINT MEETING

Purdue University, August 27-31, 1961

Section A, General Entomology, Entomological Society of America and the Society for the Study of Evolution will hold a joint meeting with the American Institute of Biological Sciences at their 1961 annual meeting at Purdue.

Program

Tuesday Morning, August 29
(9:00 A.M., E.S.T.)

Symposium: Evolutionary Problems in the Insects. I. Biogeographical Problems.

Tuesday Afternoon, August 29
(2:00 P.M., E.S.T.)

Symposium: Evolutionary Problems in the Insects. II. Evolution of Insect Species.

Thursday Morning, August 31
(7:30 A.M., E.S.T.)

Field trip: Sponsored by the Department of Entomology, Purdue University. This all-day collecting trip will be made to the Indiana Dunes State Park and vicinity. Transportation by chartered bus will be provided. Reservations must be sent by August 1, 1961. *Local tours:* The Department of Entomology. Agriculture Hall. Second Floor.

For field trip reservations and additional information write the local representative of Section A, Entomological Society of America, Dr. Leland Chandler, Entomology Department, Purdue University, Lafayette, Indiana.

The Importance of Forestry and Forest Entomology in the South[1]

By James A. Beal

Director, Division of Forest Insect Research, Forest Service, U. S. Department of Agriculture

I appreciate the opportunity to appear here today and give you my views on the importance of forestry and forest entomology in the South. When I accepted the invitation, I felt a moderate degree of confidence in my ability to handle the subject. My complacency was somewhat shaken, however, when I received a copy of your program and saw that 14 other forest entomologists were also scheduled to discuss entomology subjects. Please bear in mind that these other men are the real experts and know intimately what they are talking about. I shall, however, attempt to set the stage for them by keeping my remarks fairly general, and thus avoid treading on the toes of those who will appear later on the program.

Perhaps it is only fair to warn you at the outset that I am a firm believer in the importance of forestry and forest entomology in the South. I was born in the South, trained in forestry and forest entomology, and have spent many of my professional working years in the South. I admit to the belief that southern forests are vital factors in the economy and well-being of the people of the South, and will continue to be so indefinitely. If you will bear with me for a while, I shall endeavor to tell you why I believe these things are true, and also tell you why I think protection of these forests from insects is important.

An appropriate bench mark for viewing forestry in the South is to examine the situation as it exists today. The current and potential commercial forest area of the southern States totals more than 190 million acres. Six out of every ten acres in the South is forest land; 40 percent of the country's commercial forest area. The southern states provide a third of the total output of the Nation's lumber. They also produce two-thirds of the country's pulpwood. The total value of logs, bolts and other round timber products produced in the South has averaged roughly a billion dollars annually in recent years. In many southern states, timber is one of the most important agricultural crops. The timber products industries also rank high among the South's manufacturing industries. In some states such as Arkansas, Virginia, Mississippi, and Lousiana, forest industry ranks number one.

Let us now examine briefly the resource upon which southern forest industries depend, and something of the nature of forest industries operating on this resource. The southern forest resource is based largely upon what foresters call second-growth stands, trees which have grown on forest lands after the virgin forest had been harvested, and on worn-out agricultural lands. In large part, this resource is pine; loblolly, slash, longleaf, shortleaf and others that are well adapted to southern soils and southern climate. Hardwoods, however, such as poplar, gum, the oaks, and others also are major components of the southern forest resource.

Those who held to the belief that removal of the virgin stands in the South doomed the forests to extinction, reckoned neither with the potentialities of the land, nor with the rapid growth of the trees. The so-called timber barons, northern stockholders, lumberjacks and the public in general failed to recognize the ability of forest land or worn-out agricultural land to produce new and repeated crops of trees on which the present and future southern forest industry depends. The voices of a few conservationists were raised against the early prevailing attitude of exploitation, quick liquidation, cut-out and get-out. Instead, they urged support of forestry practices designed to provide a sustained yield of forest products, stable communities, and other of the multiple uses of forest lands.

The conservationists were seldom heard in earlier years above the crash of huge pines as they were felled, and the roar of giant sawmills. Even when audible, they were seldom heeded because foresters had little influence in regulating the pace of the timber harvest. Like bird watchers and butterfly collectors, they were considered harmless, perhaps even amusing, but certainly not practical or necessary.

Not all southern forest industries, of course, reaped their profits from the virgin forest stands and left for greener pastures. Some remained, and those that did, have prospered beyond their fondest dreams. The big expansion of forest industries in the South started in the early 1930's and the pace of acceleration has been stepped-up ever since, especially during and after World War II. In 1960, for example, 81 pulp mills were operating in the southern states and in the aggregate consumed approximately 25 million cords of pulpwood. Eight additional mills have been announced or already are under construction.

Not only has the pulp and paper industry brought a major source of income to the South but it has developed employment opportunities and improved living conditions in rural areas where improvement was most needed. It has meant more rural jobs and better paid jobs. This new rural industry also has to a large extent offset the decline of agriculture that has been general throughout the South during the past 20 years, and which for the South as a whole has resulted in large scale migration and reversion of millions of acres of former crop land to forests. The activities of the pulp companies and the expanded market for small trees has indeed been a tremendous boost to forestry in the South.

A few large sawmills are still operating in the South but most of them have been replaced by small mills, many of which are portable. Their number, although quite variable, is estimated to be in the order of 20,000. These mills are sawing one-third of the lumber currently used in the United States.

In addition to pulp and lumber manufacture, a substantial furniture business has developed in the South, much of it in the more northerly areas. The most recent Census of Manufactures lists more than 1,100 furniture plants in the South that are shipping nearly 700 million dollars worth of furniture each year.

One of the oldest forest industries in the South, turpentining, or Naval Stores, is showing unmistakable signs of new vigor. Although this industry is comparatively small, with a products value of about 100 million dollars annually, it is of major importance in many lo-

[1] Presented at the Southtastern Branch, Entomological Society of America meeting January 23, 1961.

calities. It is also important to the small landowner or the farm wood-lot owner as a cash crop during off-seasons.

I am sure all of you realize that the pulp, lumber, furniture and naval stores industries represent but a fraction of the number of products that come from our southern forests. Although other forest products as a group are tremendously important in the South's economy, it hardly seems necessary to detail them here.

I am sure too you are aware that forests benefit communities in many ways other than through the wood products obtained from them. They also serve as the storage basins for a large part of our usable water, as habitat for fish and game, summer range for livestock, and the outdoor playground for millions of people throughout the year. While it is difficult if not impossible to place a dollar value on many of these benefits received from the forest, they are real and of vital importance to the economy and well-being of the people of the South as well as to the entire Nation.

Let us look next at future prospects for forestry and forest industries in the South. All economic signposts point to a large increase in potential demands for timber and timber products in the years ahead. The Nation's population, for example, continues to expand by unprecedented amounts. Current census figures indicate that by 1975 our Nation will have grown to at least 235 million persons. And by the year 2000, now less than 40 years ahead, our population may be close to 330 million. This means new demands for all commodities including wood products. Projections made by the Forest Service on the basis of population trend, growth rate of gross national product, and other factors affecting competition between raw materials, indicate that by the year 2000, potential demand for timber and timber products may be 50 to 115 percent above consumption in 1960. The South, I am sure will be called upon to supply a substantial part of these potential needs.

Following are some of the reasons why the future of forestry in the South looks bright to me. As already mentioned, 40 percent of the Nation's commercial forest land is in this region. Trees grow rapidly in most southern forests. Logging conditions are relatively easy. Year-round employment is possible, and labor supply is relatively abundant. The market location of southern forests is also highly favorable, and distance to the industrial centers of the North and Midwest are relatively short.

From what has been said one might assume that the South will gain dominance in future forest production simply by default; that no great effort will be needed to bring about this happy situation, or to fully meet the Nation's future timber needs. Nothing could be further from the truth. It will require all of the technical know-how of the more than 3000 foresters now employed in the South, as well as the coordinated efforts of Federal, state and industrial agencies working with the small timber land owners, to realize the forest potential of the South and to reach production goals. Regional Forester Jim Vessey in the December 1960 issue of *Southern Lumberman* said, "Favorable balance between growth and drain of our wood resources at the required level will be acquired only if we take steps now to (1) Expand our productive forest area by planting or seeding with the right species, non-productive farm lands best suited to growing trees; (2) Do a better job of growing trees by improving the timber stocking of scrub-brush areas and increasing growth rates; (3) Improve utilization by reducing waste, developing uses for low grade trees and inferior species, and by increasing the life of forest products through improved and extended use of wood preservatives; and (4) reduce loss and site deterioration from wild fire, insects, disease and unwise grazing by domestic animals."

On the basis of our present knowledge it is possible to go a long way in the direction that Mr. Vessey has indicated, provided the owners of forest land are given the incentives to practice better forestry. Private companies and state and Federal agencies are increasing their efforts in this direction. Although much progress can be made within the limits of currently available knowledge, research will have to provide many new and additional answers before the ultimate goals can be achieved. This could easily be demonstrated in practically all phases of forestry.. During the time remaining to me, however, I shall confine my remarks to a single problem area; that of forest insects, their role in southern forests and something of what research may be expected to contribute to solution of forest insect problems.

Like the forester, the entomologist is playing an increasingly important role in the South since adequate protection against insects is becoming more and more a vital part of successful forestry programs. This stems from the fact that insects affect forests and forest products adversely in many ways and often to a serious extent. They attack trees of all ages, and of all sizes and species. By infesting flowers, seeds, and cones, or attacking seedlings and reproduction, they often interfere with regeneration of the forest. Certain bark beetles, defoliators and other insects kill extensive stands of timber outright. Some transmit tree-killing diseases. Others reduce the volume and lower the quality of wood in many ways. Even after wood is put into use it is often subject to attack by insects. Site, stocking and stand conditions often are altered by insects, resulting in the replacement of high quality material with that of low quality. These things are going on in our forests at all times. Because of them, we are losing inpressive volumes of valuable timber to insects each year. It follows therefore that protection of our forests and forest products from insects would go a long way towards helping to fulfill our additional timber requirements in the coming years.

No doubt most of you recognize the devastating effect of fires in the forests of the South. Here, wild fire has been rightly claimed as the number one forest enemy. Less well known is the fact that losses caused by forest insects are almost as great as fire losses, but because they are seldom spectacular they have received much less attention.

Not too long ago forest insect ravages were looked upon by many as inevitable, and that little or nothing could be done about them. In the past I have often had the feeling that some folks thought we entomologists overrated the importance of insects, and that if ignored, both we and the "bugs" would go away. That attitude no longer prevails. The greater recognition of the importance of wood as a resource, the increased interest in forestry, and the advances made in protecting forests and forest products from insects, have produced an ever increasing demand for more efficient and more economical measures to control the better know pests, and for new information on little known or recently recognized ones. This demand stems not alone from the owners of high value timber stands, but begins with the geneticist who demands protection against damage to flowers, pollen, seeds, and scions; extends to growers across the life span and harvesting of trees, and ends with the users of wood in one of its many forms.

Bark beetles lead the field from the standpoint of timber volume losses. Together they are estimated to be taking an annual toll of 400 million board feet and in addition are causing a growth loss of nearly 110 million cubic feet in southern forests. Not too many years

ago, informed entomologists felt that the southern pine beetle was about the only really important bark beetle in the South. Devastating outbreaks had been recorded and studied in widely separated areas. Thus, much was known of the potential of this pest. The southern species of *Ips*, like the common cold, were known to be always with us, attacking individual trees or even small groups, but they were relegated to a position of secondary importance, at worst something of a nuisance. We didn't know then that they could mass an attack that would kill 200 million board feet of timber in a single year. We know it now. We dismissed the black turpentine beetle with almost casual disregard. After all, why be concerned with a beetle that lived in stumps? He was welcome to them. Little did we know of the potential of this insect; of its acquired appetite for the best trees in our stands. It is now one of the big three among southern destructive bark beetles, and it will take a wiser or braver man than I to rank these species in their order of importance. On the basis of our experience there is ample cause to wonder what latent talents, or what hidden potentials lay among the many other bark beetle species that are know to infest trees in the South.

Prolonged and severe feeding by defoliators can and does result in the death of trees. Less frequent and less severe defoliation may seriously reduce the growth rate of trees resulting in growth loss. In the South, such defoliators as the pine sawflies are among the pests to be reckoned with in the pine forests.

The forest tent caterpillar, the elm spanworm, and the cottonwood leaf beetle are but a few of the important defoliators of southern hardwoods. Certain of the defoliators of pines and hardwoods like some of the bark beetles, are not following the well established rules. For example, the elm spanworm, formerly known to be innocuous and sporadic in nature, is etching a new record in the hardwood stands of the southern Appalachians. The forest tent caterpillar is doing something similar in the bottomland hardwood stands of Alabama and Mississippi where it is causing extensive damage and bringing concern to the owners of these woodlands.

The balsam woolly aphid, a fairly recent introduction into the Fraser fir stands of our southern mountains, threatens to eliminate that tree species in these areas. If this happens, the volume loss would be comparatively insignificant in light of the region's total timber resource. On the other hand, who can estimate the value of Fraser fir to the millions of recreationists who visit or spend vacations in the southern Appalachians and Smoky mountains each year?

Certainly it is easy to measure losses in volume and reduced growth that are caused by insects. It is more difficult, however, to measure the impact on the recreationist, the effect on mountain streams, and on wildlife that normally inhabit our southern forests. The point here is that forests have many values and in high use recreational or scenic areas far greater efforts in protection may be more readily justified than is possible in areas where control costs have to be based entirely on the value of the timber crops.

It is well known that seed and cone insects sometimes cause partial or near total seed crop failures, that weevils or white grubs often destroy a high proportion of seedlings, and that tip moth infestation dwarfs and reduces the growth of small trees throughout the South. The total impact on forest production of these and many other pests is, however, almost completely unknown.

The greatest impact of insects such as beetles and others that scar the growing tissues and tunnel into the wood, is among the valuable hardwoods in the southern portion of the country. They are especially damaging in the Mississippi Valley region. We don't know much about the total values lost to them, but some indication of their importance was obtained by a recent mill-scale study of overcup, Nuttall, and willow oak in Mississippi. Here it was found that losses from degrade in trees showing only medium insect activity averaged nearly $22.00 per thousand board feet. Losses in the highest value lumber were much greater.

Up to this point, I have dealt mainly with insect pests of living trees and have indicated how they may reduce volume, slow growth or impair the quality of material cut from them. I should like now to devote a few minutes to a discussion of those that attack felled trees, windthrown trees, or trees killed by fire, or other causes. This group of insects is indeed large and all of them contribute to both volume and quality losses. When trees are cut or otherwise killed, they immediately become attractive to many species of insects which hasten the process of deterioration. The rate at which wood deteriorates varies with the species, growth rate, location, proportion of sapwood to heartwood, and other factors. Among the first to attack are certain of the bark beetles. Other early invaders are the ambrosia beetles. These may be accompanied or followed by woodborers. Undue delay or carelessness during harvesting, processing or manufacture can greatly increase losses from such insects, and informed management ordinarily takes steps to minimize damage from these pests.

No discussion of forest insect problems would be complete without mention of those that attack forest products. There are many species that attack wood after it has been processed and placed in use. They construct tunnels of varying size and intensity often resulting in serious damage and sometimes in almost total destruction.

Some of the better known examples of forest products insects are the powder-post beetles of the genus *Lyctus* which infest the sapwood of hardwood products, the old house borer which attacks pine and other softwood structural timber and boards; and the termites which attack practically all species of both softwoods and hardwoods.

The total impact of forest products insects is unknown but it is certainly very great. The protection of wood in use from destructive insects would do much to extend the period of its usefulness, help meet competition from substitute materials, and assist in assuring an ample supply of wood for future requirements.

In this review of forest insect problems in the South, I certainly would not want to leave the impression that we are helpless in dealing with them. On the contrary, research has developed many controls that are widely used against certain of these pests. With minor exceptions, however, most of these controls are stop-gap methods which may be used with varying degrees of success against outbreaks. I'm sure all of you realize, however, that the suppression of insect outbreaks alone is no real solution to the problems. Our goal should be, and is to develop to the fullest extent possible preventive control or, in other words, to learn how to prevent outbreaks from occurring, and how to minimize the continuous losses from those species that are persistently troublesome. This is much more difficult than the problem of suppression.

There is a lot that we don't know about the insects which affect our forests. Boiled down, it comes to this: We seldom know why outbreaks occur. Sometimes we think we do—most often not. We seldom know why many outbreaks are short-lived; or why others persist for years, spread over wide areas, and cause heavy losses. Neither do we know why some species persist at permanently high levels. We have learned, of course, that many biological and environmental factors regulate the abundance of insects and that they must be determined

before we can understand the causes of population changes.

Much of the research needed to provide solutions to our problems will require well-equipped and up-to-date laboratories, each staffed with a corps of highly trained scientists. For example, we need proper equipment and specialists in both insect and plant physiology to explore the problem of tree resistance to insects. There is an urgent need for this information to serve as a basis for research in the development or discovery of resistant strains or hybrids. We have every reason to believe that such research would be productive. It is too much to hope that it ever will provide a panacea for all of our insect troubles but it should help certainly. Modern laboratories also are needed for specialists to study the mode of action of toxic chemicals on insects as a basis for developing cheaper, safer, and more effective insecticides; for studying the possibilities of control through the use of the little-known but powerful insect growth-regulating hormones and gamma irradiation; and to delve into problems of behavior, nutrition, population dynamics and biological control.

We are very hopeful of the results which might accrue from such basic research as that outlined above. This is true especially of research in biological control. We don't know much about these control agents in the forests of the South. As a matter of fact, considerable work will be needed before we even have any clear idea as to the identity of most of them. Much less is known of their effectiveness, individually or in combination, in insect control. Generally speaking, it is the consensus that these agents hold populations of most insects in check—that it is only the occasional outbreak which develops in spite of them. It has been observed many times, furthermore, that some of these control factors, especially insect diseases, are capable of bringing destructive outbreaks of some insects to abrupt ends. This has happened many times during past years to outbreaks of such destructive forest insects as tussock moths and several species of sawflies.

Much of the research which needs to be done is so complicated that it can never be done effectively by forest entomologists alone. The help of specialists trained in several different disciplines will, in fact, be needed to solve many of the problems. In the future, therefore, we will have to adopt the much-publicized team approach in our programs. Much of our future work will be under controlled laboratory conditions. Much of it also will be done in the woods. This will be necessary especially in our studies of the ecologies of insects and of biological and silvicultural control. In future research, we will also need the combined, coordinated assistance of all agencies and institutions, public and private alike, which have an interest in forest protection. The total needs are great, but the possible rewards in the form of reduced forest insect-caused losses are so high that all reasonable efforts should be made to strengthen the overall research program. It has been said that the South is expected to produce at least half of the Nation's timber requirements in the future. This will be difficult indeed unless research can come up with cheaper, safer, more effective, and longer-lasting methods to use in protecting forests from insect damage. I have confidence that research can do this difficult and challenging job.

RESULTS OF 1960 FUNGICIDE AND NEMATOCIDE TESTS

The *Results of 1960 Fungicide and Nematocide Tests* is now available. This report is issued annually by the American Phytopathological Society, Subcommittee on New Fungicide and Nematocide Data. This report serves as a medium for organizing and presenting the summarized results of current fungicide and nematocide testing projects. Much of the information is never otherwise published or made conveniently available. Information on products available for testing, composition of products and their sources are given. Copies of this report are available at $1.00 per copy when accompanied by a remittance, $1.25 when invoiced and billed. Address orders to A. B. Groves, Winchester Fruit Research Laboratory, 2500 Valley Avenue, Winchester, Virginia.

AMERICAN SOCIETY OF MICROBIOLOGY

The title of this note is the new name of the former Society of American Bacteriologists. This Society was founded in 1899 and has over 6,500 members. Headquarters of the Society are at 19875 Mock Avenue, Detroit 36, Michigan.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Notice of proposed use of Plenary Powers in certain cases (A. (n.s.) 47)

In accordance with a decision of the 13th International Congress of Zoology, 1948, public notice is hereby given of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in connection with the following cases, full details of which will be found in *Bulletin of Zoological Nomenclature*, Vol. 18, Part 2 to be published on April 14, 1961.

(1) Validation of the generic name *Enhydrus* Castelnau, 1834 (Insecta, Coleoptera). Z.N.(S.) 398.

(2) Validation of the specific name *akamushi* (*Trombidium*) Brumpt, 1910 (Acarina). Z.N.(S.) 400.

(3) Suppression of the generic name *Doralis* Leach, 1827 (Insecta, Hemiptera). Z.N.(S.)583.

(6) Designation of a type-species for *Nemoura* Latreille, 1796 (Insecta, Plecoptera). Z.N.(S.) 1452.

(7) Validation of the generic name *Silo* Curtis, 1833 (Insecta, Trichoptera). Z.N.(S.)1455.

Any zoologist who wishes to comment on any of the above cases should do so in writing, and in duplicate, as soon as possible, and in any case before October 14, 1961. Each comment should bear the reference number of the case in question. Comment received early enough will be published in the *Bulletin of Zoological Nomenclature*. Those received too late for publication will, if received before October 14, 1961, be brought to the attention of the Commission at the time of commencement of voting.

All communications on the above subject should be addressed as follows:

The Secretary,
International Commission on Zoological Nomenclature,
% British Museum (Natural History),
Cromwell Road,
London, S.W.7,
England.

W. E. China, *Assistant Secretary*
International Commission on Zoological Nomenclature
March, 1961

Report on the XIth International Congress of Entomology

Compiled by EDWARD H. SMITH

An event of world-wide entomological interest was the 11th International Congress of Entomology held in Vienna, Austria, August 17-25, 1960. This Congress brought together some 1600 entomologists from 56 countries, thus comprising the largest gathering of entomologists held to date. The Entomological Society of America through its official and unofficial delegates was represented by approximately 200 members. The present report reviews the historical background of the Congresses, the setting of the XIth Congress and the subject matter included in the program.

HISTORICAL SKETCH

Although the International Congress of Entomology dates back over a half century, the association of most of us with this institution is a recent development. The tenth Congress in Montreal in 1956 attracted some 600 of our members followed by an attendance of approximately 200 at the recent Congress in Vienna. In previous Congresses the combined representation from the United States and Canada did not exceed 30 delegates except at the fourth Congress held at Ithaca, N. Y.

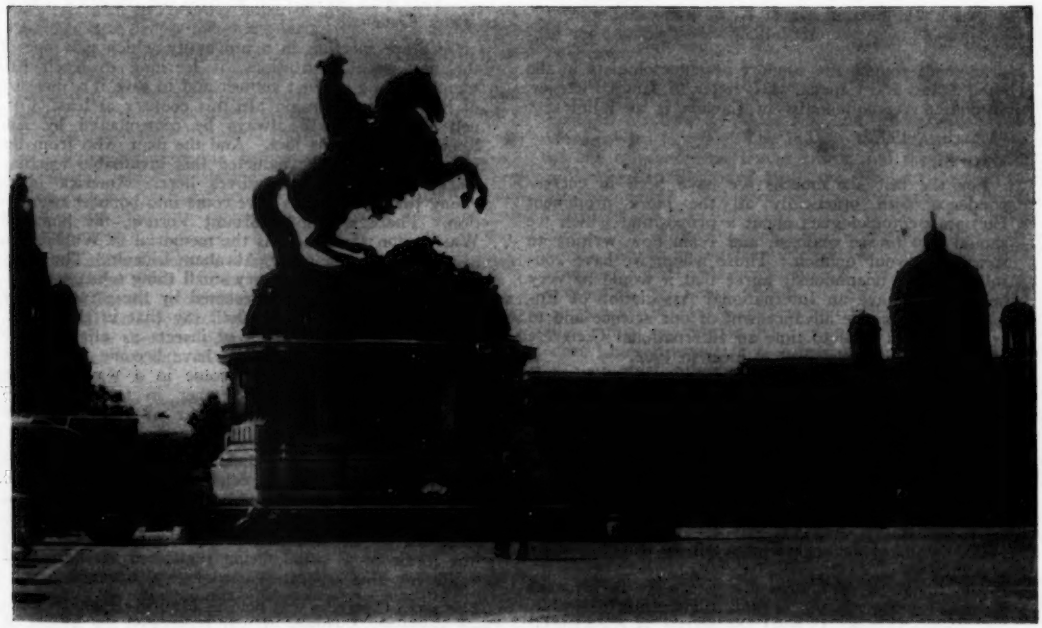
It appears certain that modern air travel, the rewarding professional experience afforded by recent Congresses, and the obvious need for greater international exchange among scientists will encourage increased participation by our members in future Congresses.

Because of the infrequency of meetings and sparse representation, the early history of the Congresses is not well known. It seems desirable to briefly review the objectives of the founders and the forces which have molded this institution for international exchange among entomologists. For the brief historical sketch which follows we have drawn heavily on the excellent report by W. R. Thompson (1956), a member of this Society and president of the 10th International Congress of Entomology. Reference has also been made to the Proceedings which have been published to date.

As is so often the case, the founding of an institution is the outgrowth of the zeal and vision of a single individual. In the case of the International Congress of Entomology that man was Karl Jordan (1861-1959) of the Zoological Museum, Trings, Herts, England. Dr. Jordan was by nature an internationalist, born and reared in Germany, serving on the staff of a renowned English museum, an accomplished linguist and a student of the world-wide community of plant and animal life.

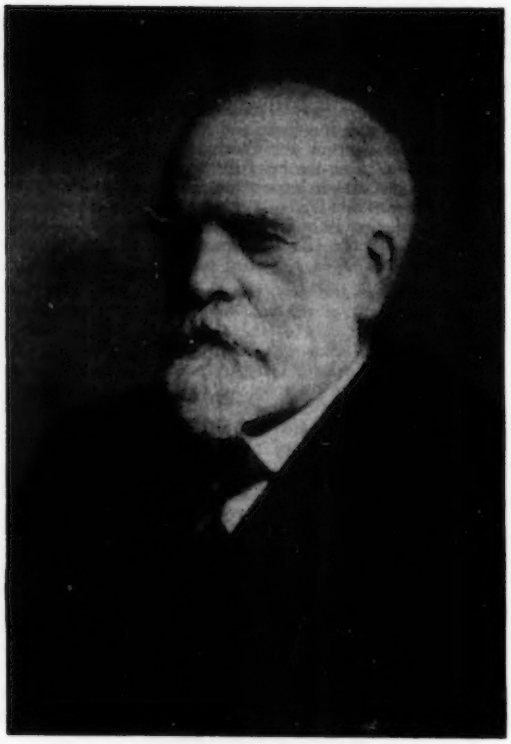
Dr. Jordan was dissatisfied with the position accorded entomology in the Zoological Congress which was founded in 1889. He was particularly concerned by the fact that in this atmosphere there seemed to be little concern among entomologists for the problems pertaining to health and agriculture. It is striking that Dr. Jordan, essentially a taxonomist, was so keenly concerned with applied aspects of entomology. It is also of interest to note that the concern which motivated him is embodied in the theme of the Atlantic City meeting: "Entomological Contributions to Human Welfare."

Dr. Jordan conferred with European entomologists in 1906 regarding a separate Congress and after some en-



HELDENPLATZ IN VIENNA

The impressive statue of Prince Eugene is a familiar landmark to those who attended the 11th International Congress of Entomology. The palatial building in which the opening exercises were held faced on this Heroes Square.



HEINRICH ERNST KARL JORDAN
1861-1959

couragement sought the support of entomologists in the United States and Canada. His letter to James Fletcher, first dominion entomologist of Canada is as follows:

"March 9, 1907.

Dear Sir:

For the last six months we have been in correspondence with practically all the more prominent European entomologists about a proposition which we should like to see realized, and I am now writing to solicit also your opinion. Those whom we have consulted almost unanimously agree that it would be very desirable to have an International Association of Entomologists for the advancement of our science and to organize from time to time an International Congress of Entomologists, the first to meet in 1908.

It is hardly necessary for me to point out the beneficent influence such an organization might exercise on Entomology in general, if the organization has the support of all earnest workers. At the Congress, where nobody's attention would be averted by other interests, general questions bearing on entomology might be discussed and thereby the efforts of collectors be guided into channels where their labors are most needed.

The details of the organization will be worked out by a committee.

We should be very pleased if you were in favor of the general idea of the organization. It is desirable, for various reasons, to treat the matter as confidential till a committee has drawn up a report.

Yours sincerely,
KARL JORDAN"

Dr. Jordan's hopes were realized and the first Congress was held in Brussels in 1910 with 150 delegates, including 10 from the United States and 3 from Canada. A start had been made.

The second Congress was held in Oxford in 1912 with official delegates from our parent societies, the Entomological Society of America and the American Association of Economic Entomology. There was a marked increase in interest in economic entomology and L. O. Howard who was chairman of the section noted this fact with pleasure, recalling that "only a few years ago morphologists and systematists hardly considered the economic workers as scientific men at all."

The third Congress was to have been held in Vienna in 1915 but the outbreak of World War I wrecked these plans and it was not until some 45 years later, 1960, that Vienna was host to the Congress. The aftermath of war delayed the third Congress until 1925 when it was held in Zurich, Switzerland with only two delegates from North America, O. A. Johannsen from Cornell and L. O. Howard. An invitation was extended to hold the next Congress in the United States. This involved the problem of financing the travel of entomologists from Europe where the economic effect of the war was still keenly felt. Through the vigorous effort of entomologists on both sides of the Atlantic a considerable sum was raised, making it possible for a reasonable number to attend.

The fourth Congress was held in Ithaca, N. Y. in 1928 with 611 persons attending. The Congress, the first on the North American continent, was highly successful and seems to have consolidated both the position of economic entomology and North American entomologists in affairs of the Congresses.

It is appropriate, considering the theme of this 1960 meeting and the selection of J. H. Comstock to be commemorated by the Memorial Lecture, that we note in L. O. Howard's presidential address the following tribute to Prof. Comstock:

"We are meeting in a university which was one of the first great institutions of learning to teach Entomology as a distinct subject and to give it a measure of its appropriate rank. In this country at least, Cornell University will always be remembered by Entomologists for this fact. And the man, who from the very start in 1872, conducted this invaluable teaching work, J. H. Comstock, lives here. America is so young that few shrines have come into popular recognition. There is one at Mount Vernon, the home of Washington; and there is the memorial in Washington to the great emancipator, Abraham Lincoln. The study of Entomology seems a very small thing when we compare it to the causes represented by these two of our national heroes, but who shall say that in the future, when the vital importance of insects as affecting the well-being of humanity shall have become fully realized, this spot shall not become in a way a shrine where Entomologists will gather in token of their respect to the first great teacher of Entomology in America!"

The fifth Congress was held in Paris in 1932 coinciding with the centennial celebration of the Entomological Society of France. Approximately 250 entomologists attended with North American entomologists being represented by a delegation of 30. L. O. Howard was in the forefront as usual, being registered as the official delegate for nine separate entomological organizations.

The sixth Congress was held in Madrid, Spain in 1935. Once again the fortunes of war frustrated the affairs of the Congress. publication of the proceedings being delayed until 1940 following conclusion of the Spanish Civil War in 1939.

The seventh Congress was held in Berlin in 1938 with 936 entomologists attending, representing 60 countries. Unfortunately this, the largest and perhaps best organized Congress up to that time, was held in an atmosphere of tension preceding the outbreak of World War II. Despite the prevailing mood, plans were made for the eighth Congress to be held in Stockholm in 1941. But in less than a year after laying these plans Europe was again at war.

It was not until 1948 that the eighth Congress was held in Stockholm. Against the background of World War II there were somber thoughts about the role of science in the quest for international harmony. The Prime Minister of Sweden commented in his welcoming address:

> "An international scientific congress has besides the professional exchange between colleagues an essential importance in so far as it is a manifestation of scholarly and scientific internationalism. Scientific research knows of no national or ideological bounds. It is universal. This apparently axiomatic statement need not be made if not our very generation had experienced frightening attempts to vindicate an opposite opinion, if we were not made aware that we have to be on our guard against tendencies to enslave scholarly research to nationalistic or imperialistsic interests."

He concluded his welcome with the salute: "We greet you as representatives of that spirit of free international exchange without which the civilized world cannot endure."

The contribution of Dr. Jordan was also noteworthy, this being his valediction. Reflecting on the matter of peaceful coexistence, he pointed out that international agreement on matters of biological nomenclature had been reached and added: "if scientists can agree on one point they can agree on others which are equally rational and desirable, a thought that awakens in our minds the possibility, and creates the hope, of general agreement on matters that deeply affect the welfare of mankind."

He then expressed his pleasure in the resumption of international meetings and added: "Here we are . . . a multitude of Entomologists from many lands, happy and proud to breathe for a short while the air of the country in which Linneaus lived and worked."

After submitting his resignation as Permanent Secretary he added in closing: "May their influence (The Congresses) on collaboration always be on the increase and assist humanity to arrive at a state of peace and contentment."

The ninth Congress was held in 1951 in Amsterdam with almost 1000 members including 5 Canadian and 8 United States entomologists. D. J. Kuenen served as president and J. de Wilde as secretary. Many of us have since become acquainted with these distinguished scientists through their active roles in the last two Congresses.

The tenth Congress was held in Montreal in 1956 with over 1400 members representing 57 countries. The delegates from the United States numbered 641, exceeding the representation by our Canadian hosts with a membership of 537. This was the introduction of many of us to international congresses, and the efficient organization, the well balanced program, hospitality and facilities made a lasting impression. With respect to the program, Dr. Wigglesworth commented as follows: "To me it has been an encouraging sign, that in spite of the enormous predominance of economic entomology in North America, the fundamental sciences of entomology should have figured so prominently in our deliberations."

A special feature of the tenth Congress was the greetings to the delegates by tape recording from Karl Jordan, then 95 years of age. His reflections (Jordan 1956) at the conclusion of a long and distinguished career in entomology will provide reassurance for far younger men: "Although the travelling days are over for the body, the mind roams the world, revisiting places where I collected, or reflecting on biological problems, which have become so innumerable since the Linnaean divinely created constant species has gone the limbo to join Manitou and the other Gods of old. I find no time for boredom at all."

It is hoped that the foregoing historical sketch reveals in part at least the nature of the institution which many of us have recently come to know.

The membership of the Permanent Committee, the governing body of the International Congress of Entomology, includes two of our members, R. L. Usinger and C. W. Sabrosky. The latter was elected at the recent Congress to succeed J. Chester Bradley who resigned after serving since 1938. To these gentlemen we extend our best wishes for success in the service of this institution dedicated to the "spirit of free international exchange without which the civilized world cannot endure."

The XIth International Congress

We come now to the present in the series of Congresses, the XIth which was held in Vienna. There were a number of features about this Congress which deserve special mention. These are representation from the Entomological Society of America, the setting of the meeting and the program itself.

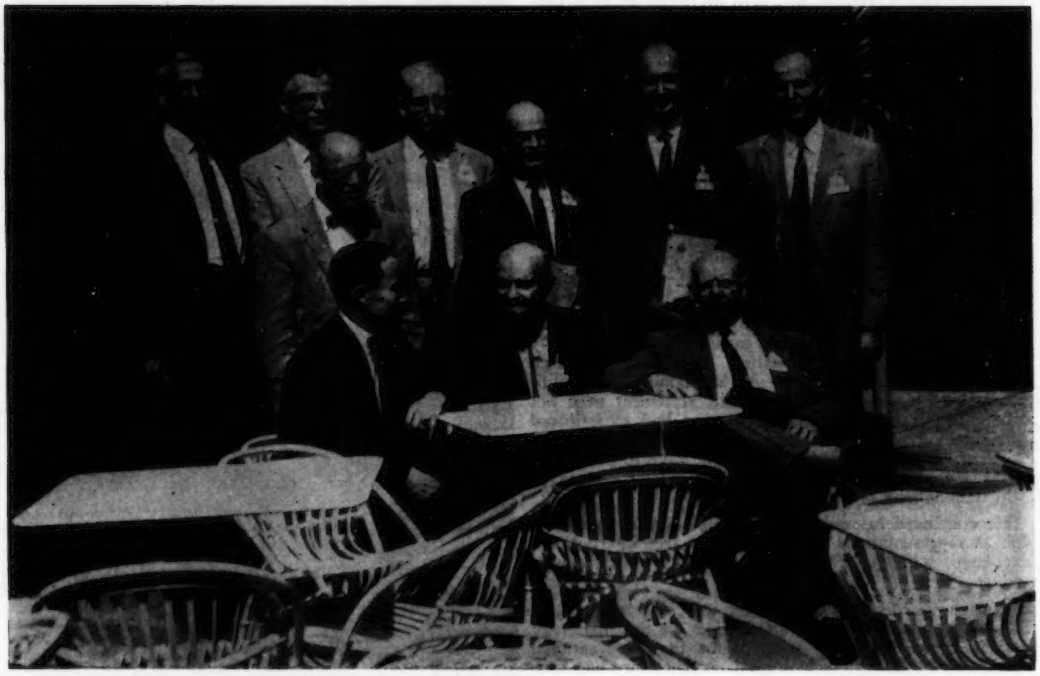
Representation

It is with pleasure that we acknowledge the support of the National Science Foundation and National Institutes of Health in providing funds for travel grants to the Congress. This support is evidence of the growing recognition which ESA is gaining and the effectiveness of its administration in representing our society to these agencies.

Announcement of the travel grants appeared in the December 1959 issue of the Bulletin of the Entomological Society of America and interested members were invited to apply. The 143 applications were screened by the committee on travel grants and the 41 recipients announced in February 1960, the list later appearing in the September 1960 issue of the Bulletin. President M. P. Jones commissioned P. H. DeBach, J. L. Gressitt, C. E. Hopla and E. H. Smith from the list of grant recipients together with C. H. Hoffmann, D. M. DeLong, Karl Maramorosch, R. H. Painter, C. B. Philip, C. N. Smith and F. F. Smith to represent the society at the 11th Congress and to bring in a report at the annual meeting of ESA. As it developed the president himself was able to attend the Congress and serve as our chief delegate.

It is suggested for consideration that in any future Congress the secretary of ESA or his representative attend to assist the Congress administration in handling the countless details concerning our membership. (There were times when an information desk manned by Bob Nelson, Mrs. Louise Stone *et al* would have been a welcome sight). The Congress also affords an opportunity to publicize the publications and other services provided by the Society.

It is noteworthy that the acceptance of a travel grant entailed only the obligation of submitting a one-page report on the Congress to the secretary of the Society. In addition to those awarded travel grants, the Society was represented unofficially by many others with total membership of approximately 200. The representation



ENTOMOLOGICAL SOCIETY OF AMERICA REPRESENTATIVES, 11th INTERNATIONAL CONGRESS OF ENTOMOLOGY
Standing, left to right: E. H. Smith, C. H. Hoffmann, D. M. DeLong, R. H. Painter, F. F. Smith, P. H. DeBach, J. L. Gressitt. *Seated:* C. E. Hopla, C. B. Philip and President M. P. Jones. C. N. Smith and Karl Maramorosch were absent when the picture was taken.

from industry was particularly impressive indicating the growing interest and responsibility which industry is taking in the fundamental aspects of our science.

THE SETTING

It is hard to imagine a more appealing city for such a meeting than Vienna. Its central location in Europe, its cultural and scholarly tradition, and the temperament of its people were highly favorable to the spirit of international exchange. It is true that the size of our group taxed the housing and meeting facilities but these inconveniences were more than offset by other features.

The spirit of the people and their attitude toward us is well expressed in the welcoming address of their Mayor:

"Greetings!

As a friend of our city, you are a welcome guest and we hope that you will receive favorable impressions during this visit. We shall be happy if Vienna remains a happy memory for you.

You will feel the pulse of a city, which, after many war disturbances bravely began rebuilding and has almost completed this difficult work. However, we have not limited our work to the rebuilding of war damages and the preservation of what was left, but have simultaneously reached for a higher goal, to make our city a healthier, more beautiful, more modern and practical place. The numerous new communal establishments, apartments, traffic, public buildings, Health and Welfare Associations are witnesses thereof.

Joy in culture, the will to progress, social responsibility are gradually establishing a new city without neglecting the venerable and conservable old. This work of rebuilding and rejuvenating Vienna is, in the truest sense of the word, being done in a democratic spirit and joint effort of the entire Vienna population. It is the more remarkable because of the fact that the poverty caused by the war and the evils due to military occupation by 4 foreign powers have created many obstacles and difficulties.

In the midst of radar towers, mine fields and barbed-wire barricades of the Iron Curtain, we Viennese awaited the day with longing when our sorely tried land could finally reestablish its independence. That day brought a new beginning of our state and city life, a sign of freedom, which will inspire us in even greater achievements.

Vienna and Austria, because of their geopolitical position and many historic experiences, feel themselves as the natural mediators between peoples, especially those in the Danube area. The neutrality of our land is for us a matter of intelligent reason as well as of heart. But we are aware that true human advancement can be achieved only in union with those peoples who regard freedom of the individual as the first law. Thus, Vienna regards itself as a dependable bulwark of the free world.

Please, dear friends of our city, accept this assurance."

/SS/ FRANZ JONAS
/SS/ Mayor of the Bundes capital Vienna.

(Translation by MRS. PAUL A. WOKE).

The meetings were held in the University, the natural history museum and several nearby buildings. In all fairness to our gracious hosts it should be noted that the timing of sessions was not rigidly adhered to and this together with separation of meeting halls made it difficult to participate fully. These disadvantages were partially offset by the pleasant surroundings, a cool garden arcade, comfortable seats and refreshments, conducive to informal visiting among delegates.

The language barrier posed a problem, no provision being made for translation service. This is an old problem as noted by a resolution passed at the tenth Congress that "in any future Congress special attention should be given to the provision of a translation service." Aside from the inconvenience it was perhaps a broadening experience for many of us to realize that our native tongue is not a universal language.

There were striking contrasts in the administrative arrangement of the XIth Congress as compared with the tenth. At the tenth, duties fell to a large segment of the dominion and provincial staffs of Canadian entomology while in Vienna, personnel available for duty was limited, with heavy loads falling to the president, the secretary and their entire families and a dedicated group of students, teachers and others. The work of the President, Karl E. Schedl; the Secretary, Max Bier; and their assistants in administering the largest entomological meeting of all time was most commendable.

The Program

It is obvious that a small committee cannot do justice to the 700 scientific reports which will eventually comprise several printed volumes. We have attempted to cover the various sections briefly hoping to grasp the current thought on the many facets of entomology as it emerged in this International Congress in 1960. In submitting these reports the committee acknowledges the limitations of the individual in being several places at one time and in avoiding the bias which arises from his own outlook and interests.

General Entomology

Comments of Dwight M. DeLong

The subject matter covered under general entomology included the fields of insect anatomy, embryology, morphology, phylogeny, evolution, paleontology, biology, biologic and geographic races or mutants and taxonomy. In addition, general papers in taxonomy and the problems of specific groups including immature stages and eggs were discussed. Special symposia were scheduled for Ephemeroptera, Plecoptera and Odonata. Although not scheduled as symposia, sectional meetings were devoted entirely to Orthoptera, Hemiptera, Coleoptera, Lepidoptera, Diptera and Hymenoptera.

The following brief report is a compilation of opinions and evaluations which are partially my own but largely those of several of my colleagues who have been willing and generous in their contributions to this evaluation report.

Certain papers, such as "Die Dolichopodiden Italiens" and "A revision of the species of the genus *Lecanium* Burm. occuring in Poland and the description of *L. slavum* n. sp." presented local problems in certain areas or in a limited portion of the fauna in certain countries or continents. Others such as "Some thoughts on arthropod phylogeny" and "De l'evolution dans les insectes. Essai critique." presented broad or basic problems in the world in general or problems concerned with the overall fauna. Also certain sessions such as those in Zoogeography were composed of papers which were very diverse in subject matter and lacked continuity.

Those who have assisted me in evaluating the various presentations at the meetings have been almost unanimous in praising the excellent paper presented by C. O. Berg of Cornell on the "Biology of snail-killing Sciomyzidae of Europe and North America." He has definitely proven that feeding on snails is the regular food habit of this family of Diptera and he illustrated the number of differences in biology between the two subfamilies. The presentation was illustrated by excellent colored slides. One of our outstanding Dipterists has referred to this paper as "outstanding, almost epic making". It has been praised in various terms by many others who were present at the presentation. According to Dr. Berg this study began as a scientific curiosity since practically nothing was known about the feeding habits of Sciomyzid larvae. All of these larvae are apparently parasitic on snails. Here is a fine example of what started out as a pure basic research study and has been found to be very significant since these larvae can be of great value in the biological control of a snail which serves as an intermediate host of one of the liver flukes.

The paper presented by D. E. Hardy on the "Diptera of Hawaii" has received a large amount of commendation. His catalogue of the Diptera of Hawaii has consumed ten years time and will be published in four volumes. Dr. Hardy states that after ten years of taxonomic study he is now ready to begin the study of biologies of Hawaiian Diptera, which investigations he had expected to begin some ten years ago. This situation is typical of taxonomy in many other fields as well as Diptera and in all parts of the world.

Other papers which presented excellent contributions to taxonomy in the field of Diptera were Curtis Sabrosky's paper on "The present status of the systematics of Diptera" and George Byers' discussion on the "Biology and classification of *Chionea* (Tipulidae)." Both received high commendation.

One of the interesting papers on morphology was presented by R. Davies on "The postembryonic development of the female reproductive system in *Limothrips cerealium* (Thysanoptera)." This work is especially interesting because of the small size of the thrips.

Dr. Davies illustrated the origins of the organs and their relative degree of development at different times during the maturation period, and concluded that the processes of development are essentially the same in Limothrips as in homometabolous insects, differing only in the time of development.

J. W. S. Pringle's discussion has been highly commended. His studies on the mechanism of the wing articulation in the worker bee (*Apis mellifera* L.) differs from the explanation of the functioning of the auxillary sclerites and wing muscles given by Snodgrass in his "Anatomy of the bee thorax (1942, 1956)." Dr. Pringle pointed out that in bees only the large indirect flight muscles of the mesothorax had the fibrillar structure necessary for contraction and relaxation at the frequency of the wing beat, whereas the remaining indirect muscles and all the direct muscles contracted tonically and served to adjust the articulation. These accessory mechanisms had control of the power and speed in flight as well as balance in the three planes of space. A 16 mm. color film was used to illustrate this research.

J. W. Evans in presenting a paper entitled "Factors associated with the origin of some of the higher categories of leafhoppers" pointed out the evolution of many basic morphological structures which are used in the separation of these groups. This was an outstanding contribution in this field of taxonomy.

Some of the most excellent color slides shown at the Congress were used by Alvah Peterson in the presenta-

tion of his paper on "Some techniques used in identifying eggs of insects." This piece of research is a fine contribution in another field.

One of the papers which caused extensive discussion was presented by Robert R. Sokal on the subject "The fundamentals of numerical taxonomy." He defined numerical taxonomy as the numerical evaluation of the affinity between taxonomic units and their employment in erecting a hierarchic taxonomic order. The major aims of the method are repeatibility and objectivity so that different scientists working independently can and must evaluate the affinity of two taxa identically equally and identically.

The most fundamental principle of numerical taxonomy is the strict segregation of phylogenetic speculation from taxonomic procedure.

The most important simple procedure in numerical taxonomy is the computation of similarities, which is done on the basis of many characters (more than 40) of the taxonomic group to be processed. All kinds of characters are equivalent (morphological, physiological or ethological).

Most of those working in taxonomic fields will immediately recognize the extreme diversity of this method and hence the prolonged discussion which followed its presentation.

The symposia pertaining to Insect Orders were all well attended by specialists from several countries and were successful, and stimulating to those individuals. In the Plecoptera symposium, for instance, new fossil records, the origin and relationship of the Plecoptera was presented by Dr. Sharov. This was followed by papers on morphology, genitalic structures, musculature of genital structures, biology and moulting. This group of specialists suggested a continuation of their symposium at the next International Congress in London in 1964.

Certain symposia were concerned with general subjects. One of the outstanding sessions which was well attended was on Insect Flight and Dispersal with Professor Uvarov as chairman. Many points of view were offered by a variety of entomologists with different backgrounds of training and experience.

Many other papers were highly meritorious, only a few which have been especially commended have been listed here.

Practically all of those attending the Congress agreed that the most valuable contribution which they received was the personal contacts with prominent and well-known scientists from many countries.

Reactions by many attending the Vienna Congress would point to the need for planning future international congresses around symposia and central themes rather than mixing individual papers under broad or general subjects.

Insect Physiology and Toxicology

Comments of Floyd F. Smith

Insect Physiology. In the symposium on insect physiology 50 papers were presented on many subjects including mode of action of insecticides, insect venoms, juvenile hormones, scent glands and insect-host relationships. This session was a sort of marathon that did not allow time for much discussion. Some 85 additional papers on insect physiology were scattered in several sections.

At the symposium on resistance W. M. Hoskins reported that the cadelle beetle and grasshoppers do not absorb DDT. He dwelt on the complex structure of insect cuticle and suggested that we should choose chemicals that are opposite in cuticular polarity so that they will be absorbed. In cases where DDT or other materials are stored in the fat we should use a non-fat insecticide in overcoming insecticide resistance.

Insect Toxicology. I heard only a few papers on insect toxicology. Dr. Busvine's paper on "Dosing in insecticide tests" was well presented and created considerable discussion. He emphasized the need for designing experimental methods to avoid unsound deductions from the results. Measuring the quantity of insecticide actually picked up by the insect is nearer the true dose. Pickup generally increases with temperature but this is affected by type of deposit—whether from crystalline deposit or oil film. Best methods give steep regression lines with homogenous populations. Slope and shape of curve indicate presence of heterogenous populations.

Insect Viruses. The section on insect viruses and insect pathogens covered 2 days of paper reading. A tragic event occurred during the congress. L. L. Ossowski from the Wattle Institute, Natal, S. Africa, who organized the section on insect viruses and was scheduled to act as its Chairman, was suddenly taken ill en route to Vienna. After an emergency operation in London, he died there on August 21.

In this section and also in other sessions several papers were given on *Bacillus thuringiensis.*

W. A. L. David of Cambridge reported on a strain of white cabbage butterfly that has become resistant to granulose virus disease which parallels the development of resistance to chemicals in other insects.

Karl Maramorosch discussed the successful continuous culture of insect tissue and the possibility of studying therein the development of arthropod borne viruses.

Kenneth Smith, in studies with the cytoplasmic iridescent virus from the dipterous larva *Tipula paludosa,* concluded that a dual process is involved in virus multiplication. The protein and nucleic acid are formed separately and then combined into the infectious particle.

D. D. Jensen of California presented new data on his earlier reported injurious effect of a plant virus on its insect vector. When *Colladonus montanus,* the vector of X-disease of stone fruits, was fed on diseased plants, the insects laid fewer eggs and died prematurely in comparison to those fed on healthy plants.

Acarina. G. Dosse of Stuttgart presided at the symposium on acarina where 5 papers were presented—all in German. Some 45 people were crowded into a small room provided for this session. When Dr. Rodriguez of Kentucky and I came into the session Prof. Dosse noted this fact. For our benefit all taking part in the subsequent discussion spoke in English.

Dr. Gasser of the Geigy Company in Switzerland reported on his development of 5 distinct laboratory strains of resistant *Tetranychus urticae* mites from a single colony by selection pressure with different chemicals.

Dr. Dosse reported on the biology of predaceous mites on tree-fruit crops in Germany. He showed a marked reduction of European red mites over a two-year period without applying acaricides.

Several people discussed the genetics of resistance in mites.

European workers have an intense interest in phytophagous mites. They have held two international conferences in recent years, one in Holland and the second in England during July of 1960. In Holland, workers in several laboratories are concerned with studies on Tetranychid mites, all working as a team.

Insect Biology

Comments of Floyd F. Smith

Biological Control. In the sections on Biological Control the objective was "harmonic control or co-existence" between parasite and host. One speaker said you must compromise between eating a few thrips legs or ppm of DDT.

The Biological Control and Insect Virus sections were held in amphitheatres where we sat at high benches and looked far down at the speaker. Every board in the floor and steps were loose and it was impossible to enter or leave the rooms without causing a series of terrific squeaks.

Other sections were held in modernized rooms with the latest in acoustics, lighting, and projection equipment. Much repair work was also in progress on the outside of the ancient University Building. To enter the main entrance of the building one passed beneath extensive staging with workmen busy at several levels.

I take issue with the criticism from some sources that too many speakers presented previously published material. R. H. Painter's story on the development of plant resistance to insect attack with special reference to alfalfa and, accompanied by excellent slides, was a credit to the Congress and to our American research. Also the symposium on migration of insects, led by B. P. Uvarov, included review papers by a number of eminent Eurasian and American scientists. A number of the presentations were very impressive. Dr. Uvarov stimulated a lengthy discussion period at the close of this session that acquainted me with many phases of insect dispersal that I never picked up from reading the literature.

Extension

Comments of Floyd F. Smith

A symposium on the economic status of insects was the nearest approach to extension entomology at the Congress. A. H. Strickland discussed methods used in the British Advisory Service to evaluate pest populations on various crops before recommending control. Hull and Downing, also from England, showed how aphid counts in sugar beet fields could be used to predict the extent of sugar beet yellows infection and the consequent reduction in yield, and determine the level at which control measures would be economically worthwhile. Pickett described the progress in biological control of pests in Nova Scotia orchards and predicted that two years hence no insecticides would be required for insect and mite control. Chairman Küenen jokingly asserted that Dr. Pickett must possess supernatural powers to put such a program into effect.

Denley Wright of England described a research-demonstration experiment for carrot rust fly control by annual applications of soil insecticides. He adjusted the dosage and varied the insecticides each year to maintain an increment in the soil below the point that would result in unsafe residues or off-flavor in the crop, yet obtain control of the rust fly. His program included a coordinated study of insect control, soil residues, chemical analysis of the crop and flavor analysis.

Mr. Küenen was very helpful in this session when he made side remarks by explaining terms or translating phrases for the benefit of the audience without seriously interrupting the speaker.

This symposium followed the theme of several interesting papers in other sections on biological control including insect pathology, that were given by workers from Europe and North America. The European type of biological control work reflects a particular philosophy stressing the utilization and augmentation or conservation of native parasites and predators but neglecting the possibilities of importation of natural enemies. The European nations, including Russia, are stressing fundamental studies of hosts and natural enemies. They are more concerned than we are in America with the adverse effect of insecticides and other factors on natural enemy populations.

Although I was handicapped by language difficulties in learning more about many papers as presented I found that most scientists were able to converse in English. I, therefore, benefitted immensely by the free exchange of information with others in my fields of interest. It is apparent that they look to Americans for guidance on problems concerning human health and insecticides. My wife and I were deeply appreciative of the universal friendliness and the many acts of kindness extended to us by entomologists and others we met in several countries before and after the Congress.

Medical and Veterinary Entomology

Comments of Cluff E. Hopla

In this report an attempt has been made to deal especially with those papers thought to be of interest from areas outside the United States and Canada. Concerning the latter, however, several papers presented by individuals from these two areas were conspicuously above the average both as to content and method of presentation. They are omitted here due to limitations of time and because it is thought that most of us are somewhat familiar with the various authors' efforts.

To those of you concerned primarily with the control of insects of medical and/or veterinary importance, my comments will not seem to do your interest justice. However, this does not necessarily reflect a personal bias, it merely happened that few papers were presented dealing with this phase of the subject.

In scanning the outline of Section 10 and the Symposia, one is impressed with the fact that the papers dealt almost exclusively with various Diptera and ticks, only one dealt with Anoplura, and none pertained to Siphonaptera.

Mosquitoes. P. F. Mattingly reported on the "Experimental study of exophily in mosquitoes". He indicated that "exophily" implies an avoidance, whether positive or negative, of the human domestic environment. Experimental work on the genetics of behaviour in relation to exophily is under way and present results indicate that a negative correlation between exophily and insecticide resistance exists.

Several species of *Anopheles* have conspicuously failed to become resistant in areas in which an unusual degree of exophily has been reported although they have become resistant elsewhere. With the development of residual insecticides, exophily has become the central problem in the control of mosquito-borne diseases. It was pointed out that in order to understand exophily, we must refer to the behaviour involved and that an important aspect of behaviour, which has been largely overlooked, concerns the part played by endogenous rhythms.

J. A. Reid reported on "Systematics and the transmission of disease". This paper was concerned with the biology and systematics of anopheline mosquitoes in southeast Asia and revealed the existence of several important sibling species. In this work, familiar forms, long thought to be a single species with one or two varieties, have proved to be groups of seven or eight species, some of which even had a series of subspecies.

Within each group the morphological differences were small, but the biological differences were sufficient to al-

low a small number of species to act as vectors of human malaria and filariasis while the majority of them were harmless. Essentially this is the same pattern discovered with the *Anopheles maculipennis* complex, but on a much larger scale.

A second paper by P. F. Mattingly entitled "The natural history of mosquito-borne viruses," developed the concept that while more than 100 arthropod-borne viruses have now been recognized, probably the large majority of them are mosquito-borne. Current studies suggest that each virus has its own distinct ecology, imposed on it, in part, by its relationship within the vertebrate hosts and in part, by the ecology of the vector. In time it should be possible to characterize each virus ecologically as well as immunologically.

An attempt was made to reduce the transmission of the viruses almost entirely to a relationship with species of the genus *Aedes*; other genera being of secondary importance. However, a notable exception was that of *Culex tarsalis* and western equine encephalitis (WEE). One of the principal values of Mr. Mattingly's papers was the vigorous discussions which followed his presentation.

"The association of the mosquito *Malaya jacobsoni* with *Cremastogaster* ants" by W. W. MacDonald was a splendid account of this unusual feeding habit for a mosquito and was illustrated with 16 mm. film.

Ticks. One of the most significant papers of the entire series was presented by Hans Moritsch and colleagues of the University of Vienna Institute of Hygiene. They have a study area in Central Austria adjacent to the village of Neunkirchen, where since 1956 all patients suspected of a virus infection involving the central nervous system have received a viralogical-serological examination. Fifty-five percent of all cases examined were found to have either a virus or antibodies closely resembling Russian Spring-Summer Encephalitis (SSE). Neutralizing antibodies were found in fourteen percent of the sera from apparently healthy persons.

In 1959, 4,672 ticks (*Ixodes ricinus*) were collected in the study area and from these, three pools of ticks were found infected with virus. These isolations were from nymphs and adults. Virus was also recovered on four different occasions from the brains of wild mice (*Microtus arvalis* and *Apodemus silvaticus*). All seven pools of virus were subsequently proven to be SSE.

Experimental studies indicated that transovarian transmission of the virus did not occur, although trans-stadial infection was demonstrated in *Ixodes ricinus* from infected larvae through to the adult. During the moulting phase, the investigators were unable to recover the virus; however, it could be found after moulting was completed up to three months in starved ticks. Infected larvae and nymphs released in a tick-tight enclosure in the study area were still infectious after hibernation for approximately seven months.

Harold Trapido discussed the "Aspects of the role of ticks in the transmission of kyasanur forest disease". As many of you know, he and his colleagues are located in Poona, India. The etiological agent of this disease has been isolated and found closely related to Russian spring-summer encephalitis, central European tick-borne encephalitis and several others of the Group B viruses.

The virus has been isolated from or antibodies demonstrated in a variety of animals including man, monkeys, small forest mammals, various domestic animals, and several species of birds. Among the arthropods investigated, virus has been isolated repeatedly from ticks of several genera, but most frequently from species of *Haemaphysalis* with a far greater number of isolations arising from *Haemaphysalis springera.*

Conflicting evidence was obtained as to whether transovarian transmission occurred. One pool of infected larvae was secured; however, subsequent laboratory studies were unable to confirm this isolation. Moreover, in an area where virus was extremely active as evidenced by repeated isolations from nymphs and adults, larvae of the subsequent generation appearing the following spring were never found infected even though thousands of specimens were examined.

A paper entitled "Distribution in west-Siberian lowland in connection with spreading of natural nidi of tick-borne encephalitis" was read by G. J. Netski. An ecological approach was utilized, dividing the western Siberian lowland into three zones. The "Middle Zone" or a transitional zone which joins parts of the northern forest-steppes had the highest and steadiest humidity. Here *Ixodes persulcatus* was the most prevalent tick and the area also had the most steady population of ticks and small mammals. According to information presented, this area had the most "perilous nidi" of tick-borne encephalitis.

As one proceeded farther south into dryer areas, subject to varying periods of droughts, *Ixodes persulcatus* was replaced by *Dermacentor pictus* and eventually by *D. marginatus.*

In all, 30 species of rodents were indicated as reservoirs of tick-borne encephalitis and Omsk hemorrhagic fever. Transovarian transmission of the viruses not thought to be important and for obvious reasons tick to rodent transfer was considered the most essential, with man entering the picture as an accidental or secondary host.

One cannot leave the ticks without mentioning Harry Hoogstraal's paper dealing with "The potential of virus-infected and tick-infested birds in the spread of disease". This was a particularly valuable contribution and it is anticipated that this paper will be in print soon for detailed study.

As one reflects back on the evidence presented in these papers, it is evident that transovarian transmission was not thought to be significant in the maintenance of the viruses discussed. A second thought gained was that ticks can usually be infected with mosquito-borne viruses, but that the reverse is well nigh impossible under experimental conditions. As to whether this holds true in nature is not known.

Mites. I. R. Harrison's paper dealing with the "Biology of poultry red mite and its control with systemic and contact insecticides" was reported by C. B. Philip to have had considerable exchange from the audience. A new sampling technique for population studies consisting of a mechanically operated trap, was used to collect mites after noctural feedings. Peak populations occurred during August and the lowest numbers during January.

The sampling technique was used for critical assessment of the activity of various chemicals used for the control of this mite. Populations were sampled before and after systemic treatment of birds or spray applications. Several of the commonly used insecticides were compared and Sevin apparently was the most successful.

Sand Flies. A. V. Domatowa's paper "The differences in the ecological requirement of certain species of Phlebotominae in the USSR" was presented in halting English, but nonetheless was a stimulating resume. In all, 21 species of sand flies were reported for the USSR and *Phlebotomus papatasci, P. sergenti* and *P. caucasicus* were considered to be the most widespread and important species. A discussion involving the moisture-loving and dry-loving species was related to feeding habits, attraction to light, and control.

Marshal Hertig's presentation of "The problem of reservoirs and the ecology of *Phlebotomus*" was a succinct summary. All epidemiological evidence points to some animal other than man as the natural reservoir of new world leishmaniansis. Natural infections of *Leishmania*, demonstrated by culture of heart blood drawn from living animals have been found in two genera of spiny rats, *Praechimys* and *Hoplomys*. Over 30 other genera of wild-caught forest animals have been found negative. Tested in a human volunteer, one spiny rat strain produced a typical human lesion. Suckling white mice have proved to be the most sensitive animals in testing the various strains isolated.

There is a sharp division between the man-biting species and the other forest sand flies as to habitats used for breeding places and diurnal shelters. For example, the man-biting group are almost never found in such places as tree buttresses and hollow logs, (where zoophilic forms are found) but occur diffusely scattered over the forest floor in fallen leaves or resting on the underside of green leaves. Larvae of at least two members of the anthropophilic group were recovered in the layers of rotting leaves. Through means of precipitin tests, determination of what animals other than man are attacked is in progress.

P. T. Johnson gave an interesting account of "Autogeny in Panamanian *Phlebotomus*". It is believed that this is the second time this phenomenon has been reported in the Phlebotominae.

Anoplura. Fritz Wayer's account of "Insect hosts and vectors of rickettsial disease" while an outstanding presentation in many ways, closely parallels his article in volume 5, ANNUAL REVIEW OF ENTOMOLOGY. Any of you who have not read that excellent resume should do so. It is one of the most informative articles to appear thus far in the ANNUAL REVIEW.

Enough of papers! At any meeting of this sort, personalities are as important (if not more so) as the printed matter. Highlights in this respect for most of us was the presence of E. N. Pavlovsky, Director of the Zoological Institute, Academy of Sciences, USSR. While he is now some 80 odd years of age, his interest is great and every one found him to be a gracious person. A select few were invited to the Russian Embassy to a reception in his honour. Several of us found his daughter, N. Pavlosky, a capable biologist and of tremendous help with her knowledge of English, French and German. Prof. Erich Martini of Hamburg, (whose text book of medical entomology remains a classic in its field) at the age of 90 retains an alert mind, his interest is still very keen and the scope of his knowledge was astounding to me.

The name of Rothschild has long been associated with the study of entomology, and the Honorable Meriam Rothschild proved to be one of the most remarkable personalities I have encountered. One of the most enjoyable experiences of the Congress was a dinner engagement with her at the Sacher and a discussion concerning the introduction of myxomatosis into England. The spread and transmission of this disease by the rabbit flea (*Spilopsyllus cuniculi*), when fully understood, will no doubt rank as one of the most fascinating and complicated vector relationships known.

No inclusion of the name Rothschild seems complete without reference to fleas. Inasmuch as the Siphonaptera were not represented by a single paper, it seems only fair (if not, I beg your indulgence) to mention that I spent three weeks at Tring, Hertfordshire, England. studying the Rothschild collection of fleas with the aid of Messrs. Smit and Hopkins. Tring bears special significance to anyone who has attended an International Congress whether or not they have an interest in fleas or beetles. To see the rooms where Karl Jordan worked, his equipment, and the fine collection of insects he established was truly remarkable. His house on Park Street, close to the Museum is still occupied by his two daughters who, to a large extent, deserve considerable credit for many of his accomplishments in later years. The imprint left by this outstanding scientist will never be lost to those engaged in the study of entomology. Without doubt, he is the "father" of the International Congress of Entomology.

CHEMICAL CONTROL INVESTIGATIONS

Comments of CARROLL N. SMITH

The conference provided a very rare opportunity for the exchange of information with entomologists from around the world. North America and Europe were the most heavily represented, but authorities from other continents were present as well. The Congress was long enough to provide an opportunity to look up and confer with experts in one's own field of special interest. A pleasant refreshment garden with adequate table space was provided for these numerous informal but highly important conferences and discussions. This is, of course, an important phase of any meeting, but was particularly valuable at the Congress because opportunities for detailed discussions with our contemporaries in other parts of the world are rare. The pleasant tours that had been scheduled also provided an opportunity for personal interchanges in addition to the chance to observe the country, some insect problems, and some aspects of chemical control. The tour to Krems and Langenlois, during which several agricultural areas and an insecticide plant were visited, was particularly helpful in this respect.

The outstanding feature of the formal sessions of the Congress, as far as chemical control is concerned, was that relatively little attention was devoted to this subject, in comparison to most of the entomological meetings held in the United States. Each of the sections had one or two papers on chemical control, but even in the section on Methods and Mediums of Control only about one-third of the papers dealt with conventional chemical methods. A large proportion of the papers on this subject came from North America. One obtained the impression that chemical control was less overwhelming in importance in Europe than in North America, but of course it is possible that local European meetings devote a large amount of attention to this phase of entomology as they do here. We are all familiar with the excellent synthesis programs carried on by a number of European chemical firms; judging by the insecticides discussed in the chemical control papers from Europe the compounds synthesized by these companies become familiar to research workers in North America about as rapidly as to those in Europe.

An important aspect of chemical control is a backlog of basic information on the chemicals used or produced by insects themselves and the study of chemical metabolism in insects. This aspect was heavily accented in the formal sessions of the Congress; in fact, one of the most lengthy of the symposia was devoted entirely to this subject. It is encouraging to see so much work of this type being done, because it is studies of this nature which will provide the leads to novel and more effective ways to use chemicals against insects.

English was the most widely used language at the Congress. I was impressed to note on several occasions that it was the language used in conversations between entomologists from different European countries who spoke different languages, neither of which was English.

Reports From Other Sources

The one-page reports submitted by delegates were indeed interesting varying in style and subject from the sublime to the ridiculous. It is unfortunate that the space limitation precludes their being included here. We have, however, lifted a few remarks indicating the varied reaction of the delegates.

Atmosphere in Vienna (D. L. Collins). Everywhere there were flowers, music, sunshine, good food, good beer, good wine, friendliness and charm and I am sure that most visitors and other members of the Congress shared my feelings of regret that we could not spend much more time in these surroundings.

Different Philosophy of Research (W. R. Henson). My impression is that most European ecologists have rather a different approach to ecological problems than that common in this country. Statistical designs are far more special and subtle though commonly much less involved. The result seems to be that many investigations appear to advance simultaneously along a number of lines rather than in steps each of which involves a set experiment. There seems to be little tendency to work in teams. Most scientists with whom I spoke would have been unwilling to restrict themselves by formal affiliation with other workers. On the other hand, I had the feeling that there was very free discussion of current work. I also had the impression that most of the younger working scientists were astonishingly well informed both in their own special fields and as general biologists. Almost all of them were anxious to discuss their work in the most general terms and within the broadest contexts. Their techniques were frequently ingenious and the conceptual basis of their work was often as interesting as the work itself.

Interesting Aside (R. L. Beard). In Czechoslovakia my family and I received most courteous treatment and were fully at our ease. Entomologists in Prague were most friendly and hospitable. I sensed a greater degree of informality than elsewhere in Europe. Laboratory facilities seemed very good—superior to some, inferior to others in western laboratories. The workers were enthusiastic and proud of their work, their city and country. If my impression is correct, it is interesting that scientific publication is encouraged by a bonus system—payment being in the neighborhood of $8.00 per page for scientific articles and $4.00 for popular science articles.

Absence of Pressure on Recipient (P. R. Johnson). The temptation to offer to present a paper and thus increase one's chances of paid Congress attendance may lead to submission of reports not satisfactory for the purpose of an international congress. I believe that the ESA grants which allowed myself and others to attend the Congress without pressure for presentation of papers are a logical and welcome approach to correct the present deplorable situation. I hope that the policy of awarding such grants —with "no strings attached"—will be continued and expanded.

The Real Value of the Congress (F. W. Plapp, Jr.). Most valuable of all was the chance to meet and talk with entomologists of similar interests to my own, from, quite literally, all parts of the world. The exchange of ideas with people I have known only from their publications or some slight correspondence was richly rewarding. I absorbed enough new ideas and renewed enthusiasm to keep me busy far into the future.

Especially enjoyable were the field trips to points of unusual entomological or historical significance. The all-day trip by boat down the Danube was a memorable experience. One member has commented on the unique opportunity for visiting when 800 entomologists are confined aboard a small ship for a day.

The values derived from participation in an International Congress like most human values are largely intangible. Some of them can, however, be alluded to here.

One is mindful of a sense of reevaluation which is engendered. Almost from the time one leaves his own doorstep he begins weighing his program, his philosophy, his lot in life against all he sees around him. This generally results in a realization that our opportunities by international standards are unparalleled.

At the Congress in company with scientists from all parts of the world one feels the vitality of the quest—the stimulation arising from the joined effort with men of diverse nationalities to advance the knowledge of our science.

Through personal experience one feels a warm friendship which scientists from other countries have for us. One senses in this an air of expectancy as if they look to us for great accomplishments in the years ahead.

The committee members express their appreciation for the opportunity of serving as delegates of the ESA at the XIth International Congress.

Respectfully submitted,
Dwight M. DeLong
Cluff E. Hopla
Carroll N. Smith
Floyd F. Smith
Edward H. Smith, *Chairman*

References Cited

Jordan, Karl. 1956. Reminiscences of an Entomologist. Proceedings 10th Int. Congress of Ent. 1:59-60.

Thompson, W. R. 1956. The International Congresses of Entomology. The Canadian Entomologist 88(7): 285-289.

ENTOMOLOGY CORRESPONDENCE COURSE AT PURDUE

A new approach to training in entomology as envisioned by Purdue University and the magazine *Pest Control* is exceeding all expectations. Believing that a course in pest control technology would be helpful to people pursuing the business of applied entomology, these two groups pooled their resources and developed such a program. The course, being written principally by L. C. Truman, consists of 18 lessons dealing with basic entomology and practical aspects of structural and industrial pests. Each chapter is developed further by J. V. Osmun and W. L. Butts and is edited by H. L. Pratt, P. J. Spear, G. L. Hockenyos, H. O. Deay, and J. A. Nelson.

The lessons are published monthly in *Pest Control*. The students enroll by paying a fee to Purdue University and receive in turn work sheets and questions for study. These are graded, commented upon, and returned to the students. This entomology course started in January of 1961 and by April 1, 1316 students were enrolled with more coming in each day. This rather fantastic number represents 49 states, the District of Columbia and 16 foreign countries. To date the great majority of the students are handling the course in an able manner and it is anticipated that a greater appreciation of the entomological aspects of pest control will be realized.

Common Names of Insects

Additions, Changes and Corrections In The List Approved by The Entomological Society of America

Forty-two proposals on common names appeared in the December 1960 number of the BULLETIN (6 (4): 211) with a request that members disapproving any proposal send their objections to the *Committee on Common Names of Insects*. The Committee has considered objections to the common name proposed for *Diploptera punctata* (Eschscholtz) and has rejected the proposed name. No objections to the other 35 proposals have been received. Therefore those 35 proposals now have final approval and the list is amended accordingly.

The list contains a few errors and there have been a few taxonomic changes since the manuscript was submitted. The following changes should be made:

p. 176, line 9 from bottom. Change name of banded hickory borer to *Cerasphorus cinctus* (Drury).

p. 178, line 21; p. 180, line 19; p. 194, lines 24 and 26. Remove question marks after *Cecidomyia*.

p. 179, line 5; p. 195, line 11. Change scientific name of cigar casebearer to *Coleophora serratella* (Linnaeus); will follow *C. salmani* on p. 195.

p. 181, line 21 from bottom; p. 193, line 5 from bottom. Change *Blastophaga to Blastophagus*.

p. 181, line 5 from bottom. Change name to *Cryptolestes pusillus* (Schönherr).

p. 184, line 39; p. 206, line 17 from bottom. Change scientific name of mushroom mite to *Tyrophagus putrescentiae* (Schrank)

p. 185, line 30. Change scientific name of peach silver mite to *Aculus cornutus* (Banks); delete *Vasates cornutus* (Banks) on p. 206; add *Aculus cornutus* (Banks)—XXIV-d2 peach silver mite on p. 192.

p. 187, line 13 from bottom; p. 204, line 2 from bottom. Change scientific name to *Psoroptes ovis* (Hering).

p. 188, line 10. Change X21 to X19.

p. 190, line 5 from bottom. The author of *Anastrepha mombinpraeoptans* is Sein.

p. 191, line 4. Change X19 to X6.

p. 191, line 24. Change *Pseudodaulacaspis to Pseudaulacaspis*.

p. 196, line 6 from bottom. Change name to *Demodex canis* var. *ovis* Railliet.

p. 198, line 27 from bottom. Change coding of *Faronta diffusa* (Walker) from U2 to U29.

p. 199, line 24. Change common name of *Hedylepta accepta* (Butler) to sugarcane leaf roller.

p. 200, line 23. Change coding of *Lithophane antennata* (Walker) from U34 to U29.

p. 209, line 21 from bottom. Change Aelothripidae to Aeolothripidae.

p. 210, line 29. Change coding of Zygaenidae from 49 to 50.

JEAN L. LAFFOON, *Chairman*,
Committee on Common Names of Insects

MEETINGS

SANTA BARBARA, CALIFORNIA. Miramar Hotel, June 19-22, 1961. Annual meeting of the Pacific Branch of the Entomological Society of America. C. H. York, *Chairman*. Shell Chemical Corp., 1008 West 6th Street, Los Angeles 54, California; H. H. Keifer, *Secretary-Treasurer*, 1112 Swanston Drive, Sacramento 14, California.

STARKVILLE, MISSISSIPPI. Mississippi State University, June 29-30, 1961. Livestock Systemic Insecticide Work Conference. W. W. Neel, Department of Entomology, Mississippi State University, State College, Mississippi.

MONTREAL, CANADA. August 6-12, 1961. XVIIIth International Congress of Pure and Applied Chemistry. Symposium on Analysis, Degredation and Metabolism of Pesticide Residues on August 7-9. Secretary, Control Committee, XVIIIth International Congress of Pure and Applied Chemistry, National Research Council, Ottawa 2, Canada.

GOULD, COLORADO. Cameron Pass 4-H Club Camp. August 6-10, 1961. The Annual Rocky Mountain Conference of Entomologists. W. Don Fronk, *Secretary*, Agriculture Building, University of Wyoming, Laramie, Wyoming.

HONOLULU, HAWAII. University of Hawaii, August 21-September 6, 1961. Tenth Pacific Science Congress, Harold J. Coolidge, *Secretary-General*, Bishop Museum. Honolulu 17, Hawaii.

LAFAYETTE, INDIANA. Purdue University, August 27-31, 1961. Annual meeting of the American Institute of Biological Sciences. Hiden T. Cox, *Executive-Director*, A.I.B.S., 2000 P Street, N. W., Washington 6, D. C.

BERKELEY CALIFORNIA. Hotel Claremont, October 9-11, 1961. Annual meeting of the Western Agricultural Chemical Association. Program details in July or August. C. O. Barnard, *Executive Secretary*, Western Agricultural Chemicals Association, 2466 Kenwood Avenue, San Jose 28, California.

BETHESDA, MARYLAND. National Institutes of Health, October 9-12, 1961. Eleventh Annual Instrument Symposium and Research Equipment Exhibit. James B. Davis, *Executive Secretary*, National Institutes of Health, Bethesda 14, Maryland; Mr. Davis is also *Exhibit Manager*.

MIAMI BEACH, FLORIDA. Deauville Hotel, October 16-19, 1961. Annual Meeting, National Pest Control Association. Maurice Oser, *President*, 1118 Stout Street, Denver 4, Colorado; Ralph E. Heal, *Executive Secretary*, Beutner Memorial Building, 250 West Jersey Street, Elizabeth, New Jersey.

QUEBEC, P.Q., CANADA. October 16-18, 1961. The annual meeting of the Entomological Society of Canada and of the Entomological Society of Quebec. A. P. Arnason, *President E.S.C.*, Research Branch, Canada Department of Agriculture, Ottawa, Ontario; E. C. Becker, *Treasurer E.S.C.* same address as President; L. L. Reed, *Secretary E.S.C.*, Production and Marketing Branch, Canada Department of Agriculture, Ottawa, Ontario; J. B. Maltais, *President E.S.Q.*, Box 457, St. Jean, P.Q., P. Morisset, *Secretary-Treasurer E.S.Q.*, Quebec Department of Agriculture, Quebec, P.Q.

BALTIMORE, MARYLAND. Lord Baltimore Hotel, October 30-31, 1961. Annual meeting of the Eastern Branch of the Entomological Society of America. J. McD. Grayson, *Chairman*, Virginia Agricultural Experiment Sta-

tion, Blacksburg, Virginia; Leland G. Merrill, Jr., *Secretary-Treasurer,* Rutgers University, New Brunswick, New Jersey.

HOT SPRINGS, VIRGINIA. Homestead Hotel, October 29-November 1, 1961. Annual meeting of National Agricultural Chemicals Association. L. S. Hitchner, *Executive Secretary,* N.A.C.A., 1145 19th Street, N. W., Washington 6, D. C.

MIAMI, FLORIDA. McAllister Hotel, November 27-30. 1961. Annual meeting of the Entomological Society of America. F. S. Arant, *President,* Dept. of Zoology and Entomology, Auburn University, Auburn, Alabama; R. H. Nelson, *Executive Secretary,* 4603 Calvert Road, College Park, Maryland; See *Program Highlights* in this BULLETIN.

Joint Meeting with the E.S.A. The annual meeting of the Southeastern Branch of the Entomological Society of America. Carroll N. Smith, *Chairman,* 612 West Stetson Avenue, Orlando, Florida; John S. Roussel, *Secretary-Treasurer,* Department of Entomology, Agricultural Experiment Station, Louisiana State University, Baton Rouge, Louisiana. Columbus Hotel.

Joint meeting with the E.S.A. The annual meeting of the Florida Entomological Society. Lewis Berner, *President,* Department of Biology, University of Florida, Gainesville, Florida; L. A. Hetrick, *Secretary,* 1624 North West 12th Street, Gainsville, Florida. Columbus Hotel.

NEW YORK, N. Y. Roosevelt Hotel, December 4-6, 1961. Annual meeting of the Chemical Specialities Manufacturers Association. A. A. Mulliken, *Secretary.* C.S.M.A., Inc., 50 East 41st Street, New York 17, N. Y.

DENVER, COLORADO. Denver-Hilton Hotel, December 27-31, 1961. Annual meeting of the American Association for the Advancement of Science. R. L. Taylor, *Associate Administrative Secretary,* A.A.A.S., 1515 Massachusetts Avenue, N. W.. Washington 5, D. C.

MY 4-H ENTOMOLOGY PROJECT TOOK ME TO ATLANTIC CITY

By JUDY RHODES
Columbia, North Carolina

When I started that 4-H demonstration, I had no idea that it would take me so far, nor had I any idea how often I should talk about those pesky cucumber beetles; but when I arrived at Atlantic City and was presented with a check from the Entomological Society of America, I decided that all the effort that I had put into my demonstration was worth it.

Up until that time I had had a partner, Don Chaplin, and we had worked as a team, but now Don was in Chicago, having won a trip to the 4-H Club Congress as North Carolina's state winner in Recreation. Don and I had won the district demonstration and then had met some stiff competition at State College at Raleigh. How I shall cherish the watch that I won there! And what a thrill it was to be told by W. A. Stephen, Extension Beekeeper, that I would have a trip to Atlantic City!

Here we were at last, right beside the boardwalk that blocked the end of the street; and registering in Haddon Hall, such a big hotel!

Ronald Outen had won this trip also as a result of his being the State winner in the beekeeping demonstration. He and I and Gerald Flynn from Grand Rapids, Michigan, were to uphold the 4-H Entomological interests. We paraded the boardwalk, sat in on meetings (Although we didn't understand much of what was being said), practiced target shooting at one of the commercial displays, saw a show, and went to the Society's annual banquet. What a meal! I was full by the time I had finished my appetizers. It was a meal I shall never forget.

Gerald Flynn, Grand Rapids, Mich.; Judy Rhodes, Columbia, N. C.; Ronald Outen, Monroe, N. C., with 4-H Entomology Exhibit at Atlantic City, N. J., November 28-December 1, 1960.

The big day was Wednesday. In the morning we went to Oak Crest High School in Atlantic City where Gerald, Ronald, and I gave our demonstrations three times before science classes. In the evening we gave our demonstrations again, this time before a crowd of entomologists in the Vernon Room of the convention hotel. We heard afterwards, that some of the professional entomologists had learned something from our demonstrations. This pleased us very much.

I could now lay aside my paper mache watermelon, the watermelon plants, the dusts, the dusters, and the other props. All of them could tell of being bundled into and out of car trunks many times.

Back home it seemed like a dream, but a very satisfying one. The thrill of having our pictures taken with the President, M. P. Jones, who, Mr. Stephen told us, had worked so hard for 4-H Entomology; of meeting with the editor, F. W. Poos and the Executive Secretary, R. H. Nelson; of making wonderful friendships; of learning through new experiences; all these and the delightful trip added up to 5 days of pure enjoyment.

Next year some other 4-H'er may be as lucky as I was in getting a trip to the annual meeting of the Entomological Society of America. I hope they will enjoy it as much as I did.

TEMPORARY POSITIONS AND RESEARCH OPPORTUNITIES IN ANTARCTIC AND PACIFIC

The Bishop Museum in Honolulu announces a position to be open probably in September for a taxonomist to spend half the year based on a research vessel to trap air plankton, with visits to Antarctic coasts and Subantarctic islands, and half the year identifying trapped material at Bishop Museum. Also, one or more temporary positions doing air, land or sea trapping in Antarctica with possibility of further assignment in tropical Pacific. Also, a possibility of research visits to new field station to be established this year in New Guinea. Inquire of J. L. Gressitt, Bishop Museum, Honolulu 17, Hawaii.

U. S. CUSTOMS AND PLANT QUARANTINES IN RELATION TO SHIPMENTS OF ENTOMOLOGICAL SPECIMENS

By ASHLEY B. GURNEY[1]

Entomology Research Division, A. R. S., U. S. Department of Agriculture

Several instances have come to my attention in which entomologists had packages of museum specimens from abroad held at U. S. Customs offices. To help prevent other entomologists from experiencing delays and incurring the expenses usually required to obtain the release of such packages, I have investigated the Customs regulations and am presenting a brief review of them. Since questions which involve Plant Quarantine regulations that cover shipments of insects arise frequently, I am taking the opportunity to summarize those regulations at the same time.

The United States Tariff Act provides for the free entry of specimens pertaining to botany, mineralogy, and natural history, when imported for scientific public collections and not for sale. Mail service is the most convenient method of transportation for small shipments from abroad because mail shipments of less than $250 in value are proceesed by Customs Mail Divisions and returned to the Post Office Department for delivery with little or no delay. If valued at more than $250, the shipment usually is directed for Customs handling to the Customs office nearest the addressee. The latter is notified that the shipment is available and informed about actions he may take to obtain it.

An alternate method of shipment is by "common carrier."

There is an important distinction between mail (whether letter mail, parcel post, air parcel post, or other classes of mail) and commercial transportation generally referred to as common carrier, such as airlines, buses, trucks, railroads, and express companies. The same airplane may carry U. S. mail and also air freight, the latter in the form of common carrier service outside of mail channels and so subject to the potential delays and charges not usually associated with mail shipments. A shipment from a foreign country, arriving by common carrier, whether subject to duty or not, is held by the carrier, until the recipient (known as the consignee) takes action to clear it through customs. It is thus necessary for the consignee or his bonafide representative to appear at the Customs office to clear the shipment, the action referred to as "making entry."

When a foreign shipment arrives by common carrier for a consignee who lives in a town where no Customs office is located, he is notified by the carrier that the shipment is being held in bond, and he may be informed that clearance can conveniently be arranged by one of several suggested licensed Customs House Brokers if the consignee prefers not to appear in person. The consignee is then subject to such charges as the broker, a private business man, wishes to make, plus small fees for items such as a Carrier's Certificate or a Release Order. Under these circumstances, the recipient may find it necessary to pay charges of from $10 to $15 or more to obtain a cigar box of pinned or papered specimens.

Senders should be advised to use mail service if it is appropriate in the country of origin. Where mail service is not satisfactory, because a package is too large for parcel post, or because service in a particular country is inadequate, recipients should know the Customs regulations pertaining to shipments by common carrier, and be prepared to arrange for the release of packages held in bond.

There are no plant quarantine restrictions on the entry of dead, dried or preserved insects, and no plant quarantine permit is required for their importation. However, because shipments are subject to routine examination and clearance on their arrival in this country to verify the nature of their contents, it is highly desirable to attach one or more conspicuous labels, such as "Dead Insect Specimens for Scientific Study," to the outside of packages.

The only concern from a plant quarantine aspect in shipments of dead specimens is that prohibited material such as raw cotton, rice hulls, hay, straw or other plant material that might carry a plant pest has not been used for packing. Excelsior, shredded or crumpled paper, absorbent cotton or cullucotton are acceptable packing materials.

The importation of living insects for experimental work, exhibition or other purposes is quite a different matter. Prospective importers are urged to obtain a federal permit for their entry in advance of shipment by application to the Plant Quarantine Division, Agricultural Research Service, Washington 25, D. C. Application should indicate species involved, intended use, method of shipping and handling, facilities available to prevent escape and final disposition of insects. Permits are issued if the species to be imported are of no potential plant pest importance or if adequate safeguards can be arranged for handling the insects in transit and destination to prevent the possible escape and establishment of a plant pest. Appropriate labels are furnished for attachment to the packages of admissible species in order to facilitate their entry. Because certain states also have insect pest laws, federal permits for the importation of plant pests are issued only with the concurrence of the plant quarantine authorities of the state of destination.

[1] The information in this note has been approved by, and largely furnished by officials in Washington, D. C., of the Bureau of Customs, U. S. Treasury Department, and of the Plant Quarantine Division, U. S. Department of Agriculture.

PROCEEDINGS OF THE THIRTY-SECOND ANNUAL MEETING EASTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

New York City, New York, October 27-28, 1960

The thirty-second annual meeting of the Eastern Branch, Entomological Society of America, was held at the Hotel New Yorker. A total of 258 entomologists and student entomologists registered at this meeting. E. N. Woodbury, Chairman, presided. The opening general session on October 27 began with the introductory remarks of the chairman. Following this, the president of the Entomological Society of America, M. P. Jones, delivered an address. Next, the report of the Executive Secretary of the Entomological Society of

America, R. H. Nelson, was given. Neely Turner, Eastern Branch Representative to the Governing Board of the Entomological Society of America presented his report following Mr. Nelson.

An invitational address was given by E. S. Phillips of Cornell University entitled, "Visual Aids, Their Preparation and Use in Scientific Presentation". A second invitational address was given by A. L. Taylor of the United States Department of Agriculture entitled, "Nematodes of Interest to Entomologists in Eastern States".

Following this, the preliminary business meeting was held at which time the report of the Secretary-Treasurer was given.

In the afternoon of October 27, the meeting was divided into two sections. Section A dealt with pests of shade tree and ornamentals and Section B dealt with insect pests of fruit, vegetable and field crops. That evening there was a showing of selected entomological films and slides were presented dealing with the XIth International Entomological Congress in Vienna.

On October 28, the morning session began with a panel discussion of "Problems and Responsibilities of Different Agencies with Respect to Insecticide Residues". The moderator was Charles E. Palm of the New York State College of Agriculture, Cornell University. Members of the panel were: Justus C. Ward, Chief, Pesticides Regulation Branch, USDA, ARS, Plant Pest Control Division; G. E. Lynn, Regulatory Advisory Committee, National Chemicals Assn., Dow Chemical Co.; Geoffrey Woodard, Pharacologist, Woodard Research Corp., Herndon, Va.; Ordway Starnes, Associate Director, New Jersey Agricultural Experiment Station, Rutgers University and F. D. Clark, Asst. to the Dep. Commissioner, Food and Drug Administration.

Following this panel, the final business meeting was held with E. N. Woodbury presiding.

Reports of the following committees were heard at this time; *Auditing Committee, Resolutions Committee, Membership Committee, Insect Losses Committee, Special Committee on Time of Meeting,* and the *Nominations Committee.*

The reports of all these committees were accepted and are included as part of this report.

It was approved unanimously by the membership that the Eastern Branch shall meet on October 30 and 31, 1961 at the Lord Baltimore Hotel in Baltimore, Maryland, and that the Branch would meet at the Benjamin Franklin Hotel in Philadelphia on November 1 and 2, 1962.

The following slate of officers was presented by J. O. Pepper, Chairman of the *Nominations Committee* and accepted unanimously by the membership: For *Chairman,* JAMES MCD. GRAYSON, Blacksburg, Va.; for *Vice-Chairman,* HOWARD BAKER, Washington, D. C.

Financial Statement

Balance on hand October 1, 1959	$1,079.16	
Receipts during the year	470.00	
Total		**$1,549.16**
Disbursements during the year	$ 768.30	
Balance on hand October 14, 1960	780.86	
Total		**1,549.16**

Balance deposited in the People's National Bank of New Brunswick, New Jersey. An itemized statement was submitted to the *Auditing Committee* and is in the files of the undersigned.

Respectfully submitted,
LELAND G. MERRILL, JR.,
Secretary-Treasurer

Report of Auditing Committee

Your *Auditing Committee* has examined the financial statement, books, and records of the Secretary-Treasurer, Leland G. Merrill, Jr., and finds them correct and in good order. The current statement of bank balance of the Branch agrees with the amount indicated in the above named financial statement.

Respectfully submitted,
S. E. LIENK
W. A. SHANDS, *Chairman*

Report of the Resolutions Committee

The seven resolutions below were presented. All were voted on favorably (we think without a dissenting vote). Number one to five were acted on as a group, while numbers six and seven were voted on individually.

1. WHEREAS, The Eastern Branch has lost some of its members by death, since the last annual meeting, be it

RESOLVED, That since the Executive Secretary has extended sympathy to the families of these members, the Eastern Branch further show its respect by a reading of the roll:

A. B. Baird	W. M. Mann
H. G. Barber	Warren Moore
D. J. Caffrey	Alice V. Renk
G. A. Edwards	H. F. Schwarz
A. B. Gahan	J. D. Sherman, Jr.
C. C. Hamilton	L. A. Stearns
R. W. Hutton	Emilio Viale

2. WHEREAS, Our officers and committees have arranged and carried through a very successful meeting, be it

RESOLVED, That the members of the Eastern Branch express their appreciation for the strong leadership of its officers and the fine work of all its committees.

3. WHEREAS, The management and staff of the Hotel New Yorker have provided excellent facilities for this meeting, be it

RESOLVED, That the Eastern Branch express its appreciation to the Hotel New Yorker management.

4. WHEREAS, Our invited speakers have made excellent presentations at this meeting, be it

RESOLVED, That the Eastern Branch go on record expressing its appreciation for these welcome contributions.

5. WHEREAS, President M. P. Jones, Branch Chairman E. N. Woodbury, Executive Secretary Robert H. Nelson and Representative to the Governing Board Neely Turner have presented unusually lucid reports of their respective activities at this meeting, be it

RESOLVED, That the Eastern Branch go on record as commending these officers for their efforts in our behalf and for their excellent reports.

6. WHEREAS, The Eastern Branch has a continuing interest in promoting improved relations with the general public, be it

RESOLVED, That the incoming Branch Chairman appoint a *Public Relations Committee* to study the matter and make recommendations for improving these relations.

7. WHEREAS, The regulation of pesticide usage within states is primarily an agricultural concern, be it

RESOLVED, That the Eastern Branch of the Entomological Society of America recommend that the enforcement of any state regulations of pesticide usage be primarily a responsibility of an agricultural agency in the state concerned, and be it

RESOLVED FURTHER, That this resolution be submitted to the *Resolutions Committee* of our parent body for consideration at its next Annual Meeting.

Respectfully submitted,
T. L. BISSELL
J. C. KELLER
J. H. LILLY, *Chairman*

Report of Representative on the Governing Board

The 1959 Governing Board met Friday and Saturday, November 28 and 29 in Detroit. A digest of their work is given in pages 20-46 in the March 1960 BULLETIN. The Board worked hard, and discussed fully many problems. Some of these will be continuing.

1. *Hotels for meetings.* The requirement that we have several large rooms for concurrent sessions limits the choice of hotels. It also limits the possibility of negotiating reduced room rates for members.

2. *Program Committee.* The members have not cooperated in sending in titles on time and in preparing abstracts according to specifications. Because of general criticism of late mailing of programs, the Board set August 15 as the closing date for titles.

3. *Branch Dues.* Two branches continue to press for the Society to collect dues for all branches. The Board is attempting to work out plans to make this unnecessary.

4. *Finances.* The 1960 budget was balanced without the necessity of raising dues. The Board and the Executive Secretary agreed that for the immediate future expenses would be reduced if necessary rather than increasing dues. Members are referred to the article on Dues in Scientific Societies on page 939 of the Oct. 7, 1960, issue of Science. Our dues are below the median for Biology and far below the average for other sciences.

5. *Resolutions.* In 1958 a resolution presented by the Eastern Branch representative was killed in the Resolutions Committee. In 1959 one of the resolutions called for action that was already under consideration. The Board does not want to act as a censor on resolutions but is trying to work out someway to avoid both suppression of resolutions by a few members as well as wording which may increase the difficulties of solving problems already under consideration.

The only action since the Detroit meeting has been an announcement of the 41 members (15 from the Eastern Branch) receiving travel grants to the Vienna Congress.

The problems of the Society are complex and in many cases there is no clear-cut solution possible. The members of the Governing Board are considering all matters conscientiously and in a democratic manner. For the first time in several years, the Governing Board completed its business before the meetings started.

Respectfully submitted,
NEELY TURNER, *Representative*

Report of Membership Committee

The Committee as initially constituted comprised the following twenty-six (26) members:

Howard Baker
E. K. Bender
Jack L. Bishop
L. W. Boulanger
J. W. Busch
J. G. Conklin
R. M. Crowell
R. F. Darsie, Jr.[1]
Paul P. Burbutis
L. G. Davis
Donald Dever
C. K. Dorsey
C. J. S. Fox
Stanley Gesell
E. H. Glass
H. L. Hansen
Elton J. Hansens
F. P. Harrison
J. Peter Johnson
Jack C. Keller
E. J. LeRoux
G. B. McCollom
Arnold Mallis
D. D. Pond
Roy F. Morris
John Weidhaas
E. H. Wheeler

A total of forty-one (41) new members have been obtained through the direct efforts of the Committee. Of that number nineteen (19) were active members and the remainder, twenty-two (22), were student members. These plus those submitted directly to the E.S.A. office represent a total of 71 members for the year.

Floyd Harrison obtained seven new members and led all Committeemen in this effort. Louis Davis, John Weidhaas and Jack Keller were close behind with six, five and five new members, respectively. Jack Bishop, Elton Hansens, Leo Boulanger, R. F. Darsie, Jr., Paul Burbutis and Arnold Mallis each obtained two or more members.

I would like to take this opportunity to thank all of my fellow members who have contributed so willingly of their time and efforts.

Respectfully submitted,
BERTON C. DICKINSON, *Chairman*

Report of the Special Committee on the Time of Meeting of the Eastern Branch

A Special Committee was formed as a result of the 31st Annual Meeting of the Eastern Branch adopting the following resolution:

". . . that the Chairman appoint a committee to study the feasibility of changing the time of the Branch Meeting and to canvass the membership with reference to its desires.

In implementing this resolution, the following steps were taken and opinions obtained:

During January, 1960, a questionaire was mailed to a select portion of the membership. In an attempt to gain an honest cross section of opinion, the following groups of entomologists were contacted:

1. Thirteen groups associated with the U.S.D.A., the Armed Forces or Canadian institutions.
2. Sixteen groups associated with industry (Sustaining Associates of E.S.A.)
3. Sixteen groups associated with state experiment stations within the area of the Eastern Branch.

Each original contact was asked to discuss this subject with his interested associates and to give the Special Committee the benefit of a collective opinion. As a result, 145 entomologists registered their preference as follows:

Number Reporting	*Preferred Meeting Time*
90	Late October to Mid-November
1	January
12	February
10	March
32	April

As a result of this survey of a select portion of the membership of the Eastern Branch, we find that a majority prefer late October to mid-November as a meeting date for the Eastern Branch.

Respectfully submitted,
F. F. SMITH
E. H. SMITH
C. L. HOVEY, *Chairman*

[1] R. F. Darsie resigned on August 30, 1960 when he was granted a leave of absence from the University of Delaware. He was replaced by Paul P. Burbutis.

Report of the Nominating Committee

Your committee proposes the following names to serve as officers of the Eastern Branch, E.S.A. for 1961:

Chairman: JAMES MCD. GRAYSON, Virginia
Vice-Chairman: HOWARD BAKER, U. S. Department of Agriculture

Respectfully submitted,
E. R. MCGOVRAN
EDWIN GOULD
J. O. PEPPER, *Chairman*

Eastern Branch Committees For 1961

Program: S. G. GESELL
B. R. WILSON
R. N. HOFMASTER
A. E. BADERTSCHER
R. E. HAMMAN, *Chairman*

Resolutions: E. H. WHEELER
D. F. BRAY
T. L. BISSELL, *Chairman*

Membership: B. C. DICKINSON, *Chairman*

Sustaining Associates: C. C. COMPTON, *Chairman*

Auditing: MAURIE SEMEL
J. B. KRING, *Chairman*

Nominating: J. O. PEPPER
E. N. WOODBURY
D. L. COLLINS, *Chairman*

Special Committee on Public Relations: FLOYD F. SMITH
C. L. HOVEY
G. S. LANGFORD, *Chairman*

Insect Losses: W. E. MCCAULEY
W. E. WATERS
P. P. BURBUTIS
W. C. HARDING, JR.
B. B. PEPPER, *Chairman*

Respectfully submitted,

LELAND G. MERRILL, JR., *Secretary-Treasurer*

PROCEEDINGS OF THE THIRTY-FIFTH ANNUAL MEETING SOUTHEASTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

Mobile, Alabama, January 23, 24, 25, 1961

The thirty-fifth annual meeting of the Southeastern Branch Entomological Society of America, was held in the Admiral Semmes Hotel, Mobile, Alabama, on January 23, 24, 25, 1961. Two hundred and three members and guests registered for the three-day meeting.

Chairman I. J. Becnel opened the first of two branch business meetings at 9:00 a.m. on January 23, 1961. Chairman Becnel appointed the following committees:

Auditing: E. N. LAMBREMONT, JOHN W. WILSON, T. R. PFRIMMER, *Chairman*

Resolutions: PHILIP CALLAHAN, ARTHUR WHIPP, C. M. BECKHAM, *Chairman*

The *Executive Committee's Report* and report of the Representative to the Governing Board were presented for consideration by members of the Branch. Chairman-elect Carroll Smith assumed the chair and introduced the chairman, Mr. Becnel, for his presidential address. Mr. Becnel's address dealt with the three R's of entomology Resistance, Residues, and Relationships.

F. S. Arant, President of the Entomological Society of America, represented the parent society and spoke on several topics of interest to the group. His primary discussion dealt with the new headquarters of the organization at College Park, Maryland.

During the meeting, seventy-four papers were presented. In addition, three invitational speakers and a panel discussion on pesticide residues were heard. One conference on insect pests of soybeans was scheduled.

Members of the branch were active on the *Local Arrangements Committee.* V. E. Hayes served as chairman of this group. He and his committee did an outstanding job providing for our needs.

In the business session of the general meeting the following business was approved:

1. *Secretary's Report:* The membership was contacted and advised of the thirty-fifth annual meeting. A call for papers was made at this time and forms for submitting titles included. The membership was further advised of the financial status of the Branch.

Members desiring advance copies of the program were urged to place reservations by forwarding one dollar to the Secretary-Treasurer. Members were strongly urged to attend and participate in the meeting.

The Branch membership showed a total of 632 members as of December, 1960. The *Membership Committee* will have a detailed account of the number of new members gained during 1960.

The financial situation of the Branch as of January 1, 1961, was as follows:

Balance on hand January 1, 1960	$376.60	
Receipts during the year	883.79	
Total		**$1,260.39**
Disbursements during the year	$595.53	
Balance on hand December 31, 1960	664.86	
Total		**1,260.39**
Balance on hand distributed as follows:		
Checking Account, City National Bank, Baton Rouge, Louisiana	$507.91	
Savings Account, No. 88317, First National Bank of Atlanta	156.95	
Total		**664.86**

2. *Report of the Executive Committee:* The *Executive Committee* of the Southeastern Branch met at 6:00 p.m., January 22, 1961, to discuss activities of the Branch. Members present were: I. J. Becnel, Chairman; Carroll Smith, Chairman-elect; L. D. Newsom, Representative to the Governing Board of the Entomological Society of America; John S. Roussel, Secretary-Treasurer; R. J. Kowal, Member-at-large; Gordon Barnes, Member-at-large; F. S. Arant, President of the Entomological Society of America; and F. E. Guyton, immediate past Chairman.

Mr. Becnel requested the concurrence on the fee for registration as set by him and the Secretary-Treasurer. The fee was $2.00 for registration and $1.00 for the program. Dr. Smith moved that the *Executive Committee* concur in this action. The motion was seconded by Mr. Kowal and passed by the committee. Mr. Kowal moved that in the future programs be mailed to all members of the Branch at least two weeks prior to the annual meeting and that the registration and program fees be combined and a registration fee of $3.00 be charged. It was seconded by Dr. Smith and passed by the *Executive Committee.*

Mr. Becnel discussed the request of the President of the Association of Southern Agricultural Workers that the Southeastern Branch, E.S.A., meet with the association in the immediate future. This was discussed by the committee and disapproved. It was further brought out by Dr. Smith that the membership voted unanimously at Savannah in 1960 for independent meetings of the Southeastern Branch. Professor Guyton pointed out the excellent public relations which were given our last two meetings when we met separately, as compared to meetings with the ASAW. Dr. Newsom stated that we were meeting separately at the present and should continue to do so.

Dr. Newsom discussed the activities of the Governing Board for the benefit of the *Executive Committee*. He stated that the Florida Entomological Society had been accepted as an affiliated member by the Entomological Society of America. He further pointed out that only fifty per-cent of the membership of the Florida Entomological Society were members of the E.S.A. and that this was a fertile field for activity of our *Membership Committee*. He stated that the annual meeting in Miami in November of 1961 would include two field trips, one to the Everglades and a second to the Vero Beach Laboratories.

In the final business session the reports of the following committees were presented:

3. *Report of the Auditing Committee:* We, the *Auditing Committee* of the Southeastern Branch, Entomological Society of America, have this twenty-fourth day of January, 1961, examined the receipts and expenditures of the Secretary-Treasurer of the Branch and do hereby certify that said receipts and expenditures are in order. We wish to commend the Secretary-Treasurer, John S. Roussel, for diligently performing the services of this office. Respectfully submitted, E. N. Lambremont, John W. Wilson, T. R. Pfrimmer, *Chairman*.

4. *Report of the Program Committee:* Your *Program Committee* began its activities by stating as its goal for the 1961 meeting a program representing as many phases of entomology as possible. The annual call for papers and program suggestions was made to the *Program Committee* in June, 1960. The formal call for papers to the membership was made in September, 1960.

The program included seventy-four submitted papers, three invitational speakers, and one panel discussion. The invitational speakers were. J. A. Beal, Director, Div. of Forest Insect Research, USDA, Forest Service; S. R. Morris, Supervisor, Gulf Region, Plant Quarantine Div., USDA, ARS; and K. D. Quarterman, Chief, Technical Development Laboratories, USPHS, Communicable Disease Center. Individuals participating in the panel discussion were: Joseph Sharman, USPHS, Communicable Disease Center; Henry Pierce, Agr. Chem. Div., Hercules Powder Co.; J. E. Brogden, Extension Entomologist, University of Florida; Richard F. Heuermann, Food and Drug Administration; Richard O. White, Head, Regulation Section, Pesticides Regulation Branch, USDA, ARS; and James B. DeWitt, Patuxent Res. Center, U. S. Fish and Wildlife Service.

The *Program Committee* consisted of L. C. Kuitert, C. R. Jordan, H. F. Schoof, E. C. Burns, L. O. Warren and B. W. Arthur, *Chairman*.

5. *Report of the Membership Committee:* The work of the *Membership Committee* of your Branch was broken down into states, each state being "worked" by that committee member residing therein. Addressograph tapes of the membership of the parent national society indicating membership enrollments for each of the Southeastern states were sent us by R. H. Nelson, Executive Secretary of the Entomological Society of America. From these lists, each committee member selected members associated with working groups of entomologists in his state; i. e., at laboratories, colleges, etc. These were then requested to contact personally non-members in their groups, to present to them the advantages of membership, and to attempt to enroll them as new members.

The effectiveness of any effort as diffuse as this depends upon the enthusiasm and energy of the workers called upon, but we believe it is about as workable an arrangement as can be devised.

The total membership for each state and the number of new members since our meeting last year in Savannah are as follows:

State	Total Membership	New Members
Alabama	37	5
Arkansas	34	6
Florida	181	19
Georgia	94	9
Louisiana	77	13
Mississippi	67	4
North Carolina	66	10
South Carolina	39	3
Tennessee	37	3

The members of the committee extend their sincerest thanks to all the members of our organization that helped us in our effort to extend our membership. Respectfully submitted, Stelmon E. Bennett, W. P. Boyer, E. P. Broadus, Dan F. Clower, L. A. Hetrick, Vernon M. Kirk, W. M. Kulash (deceased), James W. Rawson, Horace O. Lund, *Chairman*.

6. *Report of the Representative on the Governing Board:* The Governing Board of the Entomological Society of America met November 26, 1960, in the Haddon Hall Hotel, Atlantic City, New Jersey, and found itself confronted with a unique problem. Because President-Elect H. M. Harris had accepted an assignment in India which made it impossible for him to perform the duties required of the presiding officer of the Society, the Governing Board accepted his offer to resign, declared the Office of President for the year 1961 to be vacated, and proceeded in accordance with Article II, Section I of the Society's by-laws to elect a President-Elect. Article II, Section I of the by-laws provide that, "A vacancy in the office of the President-Elect shall be filled as soon as practicable by written ballot by the Governing Board from the three eligible nominees in the most recent election who received the highest number of votes." F. S. Arant was elected.

A budget of $166,000 was approved for 1961. The somewhat shaky position of the Society's financial situation was discussed. It was able to operate within its income during the year with difficulty as a result of unexpected and non-recurring expenses connected with the move to the new headquarters in College Park.

Recommendations that the mortagage on the Society's new home and the interest on the principal be paid out of the building fund were approved. Urgent need of contributions to the building fund by the membership was recognized. The Board reaffirmed its opposition to any increase in dues to pay for the Society's new home and went on record as being opposed to any increase in dues at this time.

Recognizing the need for improving public relations, a standing Committee on Public Information was established with membership from research, extension-teaching, regulatory control, industry and informational activities.

Recommendations that the Society continue as a full member of AIBS and pay membership dues to the Institute at one dollar per year per individual active mem-

ber and that the Society cooperate as fully as possible in the various programs conducted by AIBS were approved.

The Florida Entomological Society was accepted for affiliation effective January 1, 1961. Respectfully submitted, L. D. Newson, *Representative.*

7. *Report of the Public Information Committee:* A normal function of the *Public Relations Committee* has been to encourage and advise state groups regarding the various activities of public relations value. However, during the past twelve months, the Committee has not emphasized state activities, trusting that the impetus of the preceding three years would carry on. There has been a lessening of activity at the state level during the year. It is the recommendation of the Committee that the new *Public Information Committee* again exert leadership as the new year moves along.

The press room provided by the *Arrangements Committee* was operated with secretarial help at the meeting. The following members served as reporters and writers in the meeting rooms and the press room: Grover Dowell, C. R. Jordan, and E. H. Floyd. A total of thirty-nine releases were issued to news outlets, including thirty-eight newspapers and radio and television stations. Five articles and photographs were published in the local Mobile press. Two interviews were televised.

The *Public Information Committee* recommends that the Chairman appoint an unofficial delegation of workers to assist the committee. The committee recommends that an entomologist from each state other than states represented on the committee be chosen for this task. Representatives from industry, experiment stations, extension service, plant pest control, entomology research, plant quarantine, commercial entomologists and/or others be considered for this appointment. The *Public Information Committee* would have three members on it, but the Chairman will appoint six unofficial members to assist them. Herman Mayeaux, E. H. Floyd, W. E. Blasingame, *Chairman.*

8. *Report of the Resolutions Committee:*

(1) *WHEREAS,* the Southeastern Branch has lost five of its members by death since the last annual meeting,

BE IT RESOLVED, that the Secretary extend sympathy to the families of these members, and the Branch further show its respect by a reading of the roll, and that a few moments of silence be observed in the memory of these men: B. B. Fulton, O. W. Hancock, M. M. High, Walter M. Kulash, and R. A. Sheals.

(2) *WHEREAS,* the Southeastern Branch has completed a successful meeting at Mobile, Alabama,

BE IT RESOLVED, that we express appreciation to the management of the Hotel Admiral Semmes, especially Frank C. Drane and James Hartley, for providing the excellent facilities and services.

(3) *WHEREAS,* the officers of the Branch, Chairman I. J. Becnel, Chairman-Elect Carroll N. Smith, and Secretary-Treasurer John S. Roussel, have served ably and rendered outstanding leadership during the past year and at this meeting,

BE IT RESOLVED, that this body extend a vote of thanks and appreciation.

(4) *WHEREAS,* the various chairmen and members of the committees have done outstanding jobs of planning for and conducting this meeting,

BE IT RESOLVED, that the Branch express its thanks to the chairmen and members of the *Program Committee, Local Arrangements Committee* and *Public Relations Committee.*

(5) *WHEREAS,* the Branch has been honored by the presence of the President and Executive Secretary of the Entomological Society of America,

BE IT RESOLVED, that we express appreciation to F. S. Arant and R. H. Nelson for their attendance and participation in our meeting.

(6) *WHEREAS,* the program has been enhanced by the participation of certain members and distinguished visitors,

BE IT RESOLVED, that appreciation be expressed to the invitational speakers and members of the panel for their attendance and informative talks.

(7) *WHEREAS,* certain members and ladies have given valuable time and service to the success of the meeting in the press room,

BE IT RESOLVED, that the following members and ladies be thanked for their excellent and generous assistance: Grover C. Dowell, E. F. Floyd, Catherine W. Dudley, Thais L. Fulham, Margaret Ann House, and Wilma Mills.

(8) *WHEREAS,* excellent publicity has been given to the meeting by press and television,

BE IT RESOLVED, that the officials of the *Mobile Press Register* and newspapers in other states, and the television stations WKRG-TV and WALA-TV, be extended thanks for their interest and valuable cooperation.

(9) *WHEREAS,* the tour of the harbor on the State Docks Yacht and the visit to Bellingrath Gardens were highlights of the ladies' entertainment,

BE IT RESOLVED, that the proper officials be thanked for these courtesies and their hospitality.

(10) *WHEREAS,* the mixer was one of the outstanding events of the meeting and enjoyed by all,

BE IT RESOLVED, that thanks be extended to each of the companies who so generously contributed to the success of this meeting.

(11) *WHEREAS,* the regulation of pesticide usage within states is primarily an agricultural concern and has been so recognized in the form of a resolution by the Entomological Society of America,

BE IT RESOLVED, that the Southeastern Branch, Entomological Society of America, recommend that the enforcement of any state regulation of pesticide usage be primarily a responsibility of an agricultural agency in the state concerned.

(12) *WHEREAS,* in order that individuals be informed and thanked for success of this meeting,

BE IT RESOLVED, that the Secretary of the Branch send to persons mentioned a copy of the resolution affecting them. Philip S. Callahan, A. A. Whipp, C. M. Beckham, *Chairman.*

9. *Report of the Nominations Committee:* The following were placed in nomination for officers of the Southeastern Branch E.S.A.:

(1) Two members-at-large to the *Executive Committee:*
GEORGE JONES
LARRY HETRICK

(2) *Secretary Treasurer:* JOHN S. ROUSSEL, presently serving three-year term of office

(3) *Chairman-Elect:* R. J. KOWAL

The nominations of the committee were accepted and approved by the membership. Charles Lincoln, Ray Matthews, A. G. Bennett, R. C. Allen, H. B. Boudreaux, *Chairman.*

Additional business included a motion to the effect that the Branch meet with the parent organization at Miami on November 27-30, 1961.

Chairman Becnel called on President Arant and Professor Guyton to escort Chairman-Elect Carroll Smith to the rostrum. Mr. Becnel presented the gavel to Dr. Smith as the incoming chairman of the Branch.

Dr. Smith expressed his appreciation to the membership for having been honored as its Chairman for the coming year. He called for new business. Having none presented, the meeting was adjourned.

Respectfully submitted,

JOHN S. ROUSSEL, *Secretary-Treasurer*

PROCEEDINGS OF THE NINTH ANNUAL MEETING SOUTHWESTERN BRANCH, ENTOMOLOGICAL SOCIETY OF AMERICA

San Antonio, Texas, February 20-21, 1961

The ninth annual meeting of the Southwestern Branch of the Entomological Society of America was held in San Antonio, Texas, February 20 and 21, 1961.

The meeting was called to order by Chairman O. H. Graham. Following the invocation and address of welcome, Chairman Graham gave the annual address of the Chairman. His excellent address on the profession of entomology was well received.

Chairman Graham appointed the following committees:

Auditing Committee: H. E. MEADOWS, JAMES W. DAVIS, R. R. WALTON, *Chairman*

Resolutions Committee: S. R. RACE, C. F. GARNER, J. G. WATTS, C. B. COWAN, D. C. EARLY, *Chairman*

Nominating Committee: PAUL GREGG, DOUGLAS BARNES, K. T. GIVENS, HARVEY L. CHADA, R. L. HANNA, *Chairman*

Sites Committee: CHARLES A. KING, JR., DIETER ENKERLIN, HERBERT A. DEAN, L. O. SANCHEZ, DONALD A. LINDQUIST, C. F. HENDERSON, *Chairman*

Following the appointment of Committees, the report of the Southwestern Branch Representative on the Governing Board was given by C. M. Meadows.

The remarks by President of the Entomological Society of America, F. S. Arant, were heard by approximately 250. R. H. Nelson, Executive Secretary of the Entomological Society of America, also made a few remarks to the group. This was followed by an invitational address, "Insect Control in a Changing Agricultural Pattern" by H. G. Johnston, National Cotton Council.

Members and guests enjoyed a dinner and excellent entertainment at the annual banquet.

During the final business session on Tuesday, February 21st, Chairman Graham called for the following reports.

Treasurer's Report

Balance on hand February 9, 1960	$339.08	
Receipts during the year	626.66	
Total		**$965.74**
Disbursements during the year	$612.63	
Balance on hand February 21, 1961	353.11	
Total		**965.74**

A detailed copy of the Treasurer's Report was examined by the Auditing Committee and is in the files of the undersigned.

Respectfully submitted,
A. C. GUNTER
Secretary-Treasurer

Report of Auditing Committee

We, the *Auditing Committee* of the Southwestern Branch, Entomological Society of America, have this 21st day of February, 1961 examined the receipts and expenditures of the Secretary-Treasurer of the Branch and do hereby certify that said receipts and expenditures are in order.

Respectfully submitted,
JAMES W. DAVIS
H. E. MEADOWS
R. R. WALTON, *Chairman*

Report of Nominating Committee

The Nominating Committee appointed by the Chairman of the Southwestern Branch of the Entomological Society of America on February 20, 1961, met on that date and after due deliberation selected the following persons to be nominated for the indicated positions at the final business session of the 1961 meeting:

Chairman—SHERMAN W. CLARK
Chairman-Elect—MANNING PRICE
Member of Governing Board—C. R. PARENCIA
Executive Member of Executive Comm.—DONALD A. LINDQUIST

Respectfully submitted,
DOUGLAS BARNES
K. T. GIVENS
PAUL GREGG
HARVEY L. CHADA
R. L. HANNA, *Chairman*

Report of Committee on Resolutions

Whereas, the members of the Southwestern Branch of the Entomological Society of America in its ninth annual meeting have enjoyed the friendly hospitality of the City of San Antonio:

Be it resolved, that we thank the manager of the Granada Hotel for the very fine facilities provided for our meeting and the courteous service which we have enjoyed.

and be it further resolved, that the local arrangements committee consisting of Paul Gregg, Chairman, E. L. Buchanan, R. O. Drummond and D. M. McEachern be highly commended for their diligent efforts in making our meeting so pleasant and successful.

and be it further resolved, that thanks be extended to the Program Committee consisting of Ted McGregor, Chairman, Douglas Barnes, Eldon A. Cleveland, D. E. Howell, J. R. Brazzel, James A. Deer and S. R. Race for the exceptionally good program prepared for this meeting.

and be it further resolved, that the management of the companies making donations to the entertainment fund be thanked for their generous support.

and be it further resolved, that thanks be extended F. S. Arant, President, and R. H. Nelson, Executive Secretary of the Entomological Society of America for their remarks and presence at our ninth annual meeting.

and be it further resolved, that whereas a resolution passed by the eighth annual meeting of the SW Branch, E.S.A., pertaining to the inclusion of the Southwestern Branch in the rotation of the site of the annual convention of the parent society and whereas the governing board of the E.S.A. did not act favorably upon this matter, therefore be it resolved that the Southwestern Branch again request the parent society, that we being a duly constituted and recognized branch, be scheduled in the normal rotation sites for the annual convention of the E.S.A., and that a copy of this resolution be furnished the Secretary of the Southeastern Branch.

and in conclusion be it resolved, that copies of these resolutions be transmitted by the secretary to the individuals who have carried out their responsibilities so effectively.

Respectfully submitted,
S. R. RACE
J. G. WATTS
C. B. COWAN
C. F. GARNER
DOUGLAS C. EARLY, *Chairman*

Report of Committee on Necrology

The committee reported that George G. Prabandt of Stauffer Chemical Company, Research Department, was killed in an automobile accident in Mississippi on April 6, 1960. Further details will be reported to the Secretary-Treasurer in due time concerning this accident.

Respectfully submitted,
C. N. SMITH
A. S. PELA
M. A. PRICE
C. A. KING, *Chairman*

Report of Committee on Insect Surveys and Losses

The name of the Committee was changed from *Committee on Losses Caused By Insects* to *Committee on Insect Surveys and Losses* to conform with that of the Committee of the Parent Society. Chairman O. H. Graham reappointed the entire membership and added Dieter Enkerlin S. to represent Mexico. W. H. Newton replaced J. H. Hawkins in October. The Committee continued work on the accumulation of insect loss data which was initiated in 1959.

The Committee's report to the Branch in February of last year included a table on "Estimated Losses Caused by Insects to Several Crops and Classes of Livestock in New Mexico, Oklahoma and Texas in 1958." The report was distributed to the membership and others, was well received, and widely used by various communication media within areas of the Branch. This Committee's activities are reported to have exerted considerable influence on creation of interest in similar activities in several of the sister Branches.

The procedure used this year was similar to that of last year. The Committee did not feel that it was ready to expand its activity to include more crops and classes of livestock or to attempt to compute monetary values of these losses. It felt that this should be undertaken after procedures for accumulating loss data were better developed and organized. Unfortunately, procedures for accumulating loss data in Mexico had not been developed to the extent that such data could be prepared for inclusion in this year's report. The reporting form was revised for use of contacted persons qualified to make an estimate of losses caused by insects to various commodities in a given area. Reports were made on a County or Crop Reporting District basis within the three States. The pest or pest complexes were listed and appropriate units of loss were indicated. These data served as a basis for computing losses for a commodity in a State based on available production figures in 1959.

Dr. Nielsen of New Mexico, Mr. VanCleave of Oklahoma and Mr. Newton of Texas were given responsibility for making contacts and for compiling the reported loss data within their respective States. Personnel of the following agencies were contacted for an estimate of appropriate loss data: State University or College Entomology and other Departments; State Agricultural Experiment Stations; State Boards of Agriculture; USDA Entomology Research, Plant Pest Control, and Animal Disease Eradication Divisions; and Industry. Selected individuals of some of the above agencies and agricultural economists assisted in the compilation and evaluation of the accumulated loss data.

There was an increase of 33 percent in the number of individuals reporting loss data over the previous year indicating considerable progress in this respect. Dr. Nielsen of New Mexico received reports from 43 persons, Mr. VanCleave of Oklahoma from 102, and Mr. Newton of Texas from 90. Estimated losses caused by insects to several crops and classes of livestock are given in the attached table.

Your Committee submits the following recommendations:

(1) That the Committee discontinue the preparation of an annual report on loss data because such reports are now being published in the Cooperative Economic Insect Report issued by the Plant Pest Control Division, ARS, USDA.

(2) That the Committee and the Branch continue to support and to assist the Plant Pest Control Division in the accumulation and publication of loss data.

(3) That the Committee directs its efforts toward the development of methods which will result in more reliable estimates of losses caused by various insects and toward the improvement of survey and detection methods.

(4) That members of the Branch participate actively in or support fully the activities of this Committee making its function a Branch rather than a Committee Project.

Respectfully submitted,
A. J. GARON, JR.
W. H. NEWTON
G. L. NIELSEN
A. S. PELA
H. W. VANCLEAVE
DIETER ENKERLIN S.
C. R. PARENCIA, *Chairman*

Report of Site Committee

The *Site Committee* makes the following recommendations:

1. That the 1962 Branch meeting be held in Oklahoma City in accordance with the recommendation of last year's *Site Committee.*
2. That the 1963 Branch meeting be held in Houston, Texas.
3. That the *Chairman-Elect* appoint a Committee to study the plan for rotating the Branch meeting among the four areas: Texas, Oklahoma, Mexico and El Paso-New Mexico, and report its findings not later than the 1962 Oklahoma City meeting, so

that they may be presented to the Branch membership for consideration at that time.

4. That the committee also explore the requirements and necessary arrangements for holding a meeting in Mexico City in 1964, to meet concurrently with the Mexican National Congress of Entomology and Plant Pathology.

Respectfully submitted,
C. A. KING
L. O. SANCHEZ
H. A. DEAN
D. ENKERLIN S.
D. A. LINQUIST
C. F. HENDERSON, *Chairman*

Old Business

A proposal that the Branch abolish the *Vice-Chairman* and establish a new Office, the *Chairman-Elect* in which the incumbent would serve one year and then succeed to Chairman of the Branch, was submitted at the Eighth Annual meeting in accordance with the By-Laws of the Constitution. Members were notified in writing at least 30 days prior to the actual voting on this proposal. This motion was placed before the group by Mr. R. R. Walton and the motion was seconded by C. M. Meadows and carried 43 to 12. Article III of the Constitution concerning Officers will be changed as follows:

"Section I. The officers shall consist of a Chairman, Chairman-Elect and Secretary-Treasurer. The Chairman-Elect will be elected annually and after serving one year will succeed to the Chairmanship of the Branch. The Secretary-Treasurer shall be elected biennially."

The nominees of the *Nominating Committee* were duly elected.

New Business

The Chairman expressed his thanks to Camara de Industria y Transformaccories, Seccion de Parasitidas y Fertilizantes and to H. G. Johnston, guest speaker.

H. E. Meadows moved that the Constitution of the Southwestern Branch be amended at the next annual meeting to provide for the selection of a nominee for National President-Elect by the Executive Committee. This was approved by the group and the proper procedure will be followed for presenting this at the next annual meeting.

Since there was no additional new business or old business, it was moved and seconded that the meeting adjourn.

Respectfully submitted,
A. C. GUNTER, *Secretary-Treasurer*

MEMBERS IN THE NEWS

R. H. DAVIDSON, Representative of the North Central Branch on the Governing Board served as Society representative at the inauguration of James Morgan Reed as president of Wilmington College, Wilmington, Ohio on April 30, 1961.

LEV F. CURL, U.S.D.A. Plant Pest Control Division, has transferred to field service as Regional Supervisor for Mexico with headquarters at Monterrey, N. L.

J. ALEX MUNRO has been appointed entomologist of the Los Angeles State and County Arboreum in Arcadia, California.

M. H. HATCH of the University of Washington continues as Editor of *The Biologist*, the quarterly journal of the Phi Sigma Society.

E. B. VINSON represented the Entomological Society of America at the inauguration of Leslie Stephen Wright as President of Howard College in Birminghan, Alabama.

JUSTIN W. LEONARD of the Michigan Department of Conservation was elected President of the Michigan Academy of Science, Arts and Letters on March 25, 1961. A 25-year member and a Fellow of the old Entomological Society of America, he is one of the Society's recognized authorities on the pesticides-wildlife problem.

C. B. PHILIP and L. E. ROZEBOOM were elected to the Council of the American Society of Tropical Medicine and Hygiene at its annual meeting in November, 1960.

KARL MARAMOROSCH, who for the past 12 years was on the staff of the Rockefeller Institute in New York, has accepted an appointment as senior entomologist to the Boyce Thompson Institute for Plant Research, Inc., in Yonkers, New York.

PHILIP J. DARLINGTON, JR., of Harvard has been awarded the Daniel Giraud Elliot Medal by the National Academy of Sciences. The medal is in recognition of Dr. Darlington's book, *Zoogeography: The Geographical Distribution of Animals.*

GEORGE F. KERBEY has been named manager of the Fairfield Chemicals Department, Niagara Chemical Division, Food Machinery and Chemical Corporation in New York City. Fairfield Chemicals Divisicn is a Sustaining Associate of the Entomological Society of America.

M. P. JONES, 1960 President of the Society, retired from the Extension Service of the U. S. Department of Agriculture on March 13, 1961. M. P. has become the embodiment of extension entomology throughout the country and his replacement will be difficult. You may write him at 412 North Norwood Street, Arlington 3, Virginia.

GEORGE W. BYERS of the University of Kansas is the author of an article on the scorpion fly and another on the tsetse fly in the 1961 edition of *Encyclopedia Britannica.*

CLAY LYLE, dean and director of the Division of Agriculture, director of the Experiment Station and director of the Extension Service at Mississippi State University, retired as of February 1, 1961. Dr. Lyle, a 35-year member, was president of the former American Association of Economic Entomologists in 1946.

RALPH W. SHERMAN, Representative of Section E on the Governing Board, is working on a History of OPEDA. The initials refer to the Organization of Professional Employees of the Department of Agriculture. NOEL D. WYGANT of the U. S. Forest Service is the OPEDA representative for Colorado.

MOUFIED A. MOUSSA has accepted a position with JOHN J. FAVINGER, State Entomologist, in the Indiana Department of Conservation at Indianapolis. This Department is now in the new State Office Building at 100 North Senate Avenue, Indianapolis 4.

HUGH L. KEEGAN, Lieutenant Colonel at the Army Medical School at Fort Sam Houston has completed a revision of his manual, *Some Venomous and Noxious Animals of the Far East.* This is a treatise of 42 pages with 70 illustrations.

GLEN E. LEHKER has returned to Purdue University as professor of entomology after completion of two years with the U. S. International Cooperation Administration in Pakistan.

CHARLES LINCOLN, Head of the Department of Entomology at the University of Arkansas, has prepared a mimeographed listing of staff members, graduate and undergraduate students, former major students with present positions and of entomology research projects at the University. This is a convenient source of information.

W. E. BICKLEY, head of the Department of Entomology, University of Maryland, was elected president of the American Mosquito Control Association at their 1961 meeting. The officers, regional directors and *Mosquito News* editorial staff are nearly all Entomological Society of America members. For future planners the Association will meet in Galveston, Texas on March 5-7, 1962.

JAMES A. BEAL, Director of the Division of Forest Insect Research, Forest Service, received an Achievement Award from the Alumni Association of the State University College of Forestry at Syracuse University, during celebration of the 50th Anniversary of the College in mid-April, 1961. Dr. Beal, who has been a member of ESA for 35 years, was presented with a scroll and citation listing his contributions to the profession of forest entomology.

JOHN E. ECKERT and FRANK R. SHAW are the authors of *Beekeeping*, a book published by Macmillan in New York in 1960. Apiculturists, professional and amateurs, take note. The price of the book is $12.50.

C. A. WEIGEL, retired U.S.D.A. entomologist, has called our attention to a series of books, *The Rivers of America*. In the one on *The Delaware* by H. E. Wildes there is an interesting account of black flies spurring on the founding fathers as they deliberated on the Declaration of Independence.

PAUL W. OMAN, 1959 Society President, is enjoying his work in the Orient with headquarters in New Delhi. He reports our possible interest in a strike of Toddy Tappers in India. We suspect an implication.

C. E. MICKEL, professor emeritus at the University of Minnesota, represented the Entomological Society of America at the inauguration of O. Meredith Wilson as president of the University on February 23, 1961.

MARSTON E. YOUNGBLOOD, a Master Sergeant in the U. S. Army, has been assignd to the Department of Entomology at the Walter Reed Army Institute of Research.

D. F. MILLER, a 30-year member, has retired as professor and chairman of the Department of Zoology and Entomology at Ohio State University. He will be succeeded on September 1, 1961 by GEORGE W. WHARTON, JR., widely recognized authority on Arachnids and at present head of the Department of Zoology at the University of Maryland. C. R. NEISWANDER, a 40-year member, retires as of June 30, 1961 as Associate Chairman of the Department of Zoology and Entomology at Ohio State University and in charge of entomology at the Wooster Experiment Station. He will be succeeded by ROY W. RINGS, Chairman-Elect of the North Central Brand of the Society.

SOCIETY COMMITTEES

The 1961 standing committees of the Society were published on pages 48 and 49 of the March BULLETIN. A list of Society representatives was also given. Special committees and additional representatives appointed by President Arant are given here. There has also been a change in a standing committee.

Standing Committee

Committee on Insecticide Reference Standards

J. W. Young, Kansas City, Missouri.....(1961)

Mr. Young replaces Rosmarie von Rümker, who asked to be relieved of this assignment.

Editorial Committee

Committee on the Index to the Literature of American Economic Entomology

T. L. Bissell, College Park, Maryland
C. F. W. Muesebeck, Washington, D. C.
Howard Baker, *Chairman*, Beltsville, Maryland

Governing Board Committees

Committee on Publication Policy

L. D. Newsom, Baton Rouge, Louisiana
E. A. Steinhaus, Berkeley, California
C. B. Philip, *Chairman*, Hamilton, Montana

Committee on Nominations to Standing Committees

M. P. Jones, Arlington, Virginia
R. W. Sherman, *Chairman*, Washington, D. C.

Special Committees

Committee on Local Arrangements

Alfred S. Mills, Registration Desk, Miami, Florida
John E. Porter, Meeting Room Facilities, Miami Beach, Florida
John R. King, Entertainment and Banquet, Fort Pierce, Florida
Richard M. Baranowski, Ladies' Activities, Homestead, Florida
Lewis Berner, Insect Collecting Trips, Gainesville, Florida
Carroll N. Smith, Sight Seeing and Local Tours, Orlando, Florida

Chairmen of Exhibits, Publicity, and Photographic Salon Committees

F. Gray Butcher, *Chairman*, Coral Gables, Florida

Committee on Publicity

Grover C. Dowell, Little Rock, Arkansas
Sam R. Morris, New Orleans, Louisiana
Herman S. Mayeux, *Chairman*, Jacksonville, Florida

Committee on Exhibits

John D. Haynie, Gainesville, Florida
Thomas J. Walker, Gainesville, Florida
J. Robins Wood, Liaison Local Arrangements, Miami, Florida
John M. Bellows, Miami, Florida
George W. Dekle, *Chairman*, Gainesville, Florida

Committee on Photographic Salon

Milledge Murphey, Jr., Gainesville, Florida
Frank Mead, Gainesville, Florida
Ray R. Kriner, Greencastle, Pennsylvania
Lewis S. Maxwell, *Chairman*, Tampa, Florida

Committee on Establishment of Standard Test Methods

A. W. Lindquist, Beltsville, Maryland
G. F. Ludvik, St. Louis, Missouri

K. D. Quarterman, Savannah, Georgia
Harold T. Reynolds, *Chairman*, Riverside, California

Committee on Memorial Lecture Honorees

E. N. Cory, College Park, Maryland
F. E. Guyton, Auburn, Alabama
D. E. Howell, Stillwater, Oklahoma
H. H. Knight, Ames, Iowa
Roy Hansberry, *Chairman*, Modesto, California

Committee on Joint Meetings

James A. Slater, Storrs, Connecticut
L. S. Jones, Riverside, California
James McD. Grayson, *Chairman*, Blacksburg, Virginia

Committee on Resolutions

Please see separate note on this committee.

Society Representatives

Representative to the Fourth Conference on Agricultural Meteorology

John T. Medler, Madison, Wisconsin.....1961

Representative to the International Union for the Study of Social Insects, Pavia, Italy

Orlando Park, Evanston, Illinois.....1961

Representative to the Tenth Pacific Science Congress, Honolulu, Hawaii

Paul DeBach, Riverside, California.....1961

Representative on the Council of the American Association for the Advancement of Science

Joseph R. Larsen, Jr., Philadelphia, Pa.....1961-1962

Committee on Resolutions

If Society members have any suggestions or ideas to present as resolutions at the Miami meeting, these may be sent to any committee member listed below, preferably in the style of a formal resolution and with sufficient carbon copies to permit their transmittal to the other committee members without copying.

J. E. Bussart, 330 East Grand Avenue, Chicago 11, Illinois

A. W. Lindquist, Entomology Research Division, Plant Industry Station, Beltsville, Maryland

Marvin E. Merkl, P. O. Box 8, Leland, Mississippi

Paul O. Ritcher, Department of Entomology, Oregon State College, Corvallis, Oregon

A. N. Tissot, Agricultural Experiment Station, University of Florida, Gainesville, Florida

C. M. Beckham, *Chairman*, Department of Entomology, Georgia Experiment Station, Experiment, Georgia

NECROLOGY

DOVE, WALTER E. 66. Commercial entomologist and parasitologist. Formerly with the U. S. Department of Agriculture. At Anne Arundel Hospital, Annapolis, Maryland, March 22, 1961.

HIGH, MARVIN M. 76. Retired U. S. Department of Agriculture entomologist. At Gulfport, Mississippi, January 3, 1961.

KELEHER, THOMAS A. 93. Retired U. S. Department of Agriculture employee and silkworm expert. At his home in Silver Spring, Maryland, March 9, 1961.

WHARTON, M. F. 65. Officer of Arizona Fertilizer and Chemical Company. In Chicago, Illinois, March 23, 1961

COMMENTS ON A SINGLE SERVICE COURSE IN ENTOMOLOGY

By SAMUEL A. GRAHAM

School of Natural Resources, University of Michigan

At the recent meetings of the North Central Branch of the Entomological Society of America in Kansas City, the merits and demerits of a single service course in entomology were discussed. Some very interesting ideas were expressed, but they were all made from the entomological viewpoint and not from that of those who would be served. In these comments another side will be presented, and some revolutional suggestions made, chiefly for the purpose of stimulating thought.

A service course means to me a special course designed to meet the needs of a specific non-entomological discipline, such as horticulture, forestry, home economics, animal husbandry, or medicine. Each discipline needs information about the insects that affect those things with which it is concerned. The primary objectives of a service course would be to meet these requirements and not to train entomologists. Thus we have service courses in household insects, forest entomology, medical entomology, and others. Quite naturally, each school or department to be served, desires something special for its students. If all such desires were to be met by an entomology department, the result would be a proliferation of courses that would be beyond reason. Therefore, the desire to give a single service course that will suit everyone's needs is understandable. But how any one course could be designed to suit all areas that need special service is difficult to imagine.

The proposals for a single course discussed at Kansas City were, according to my definition, not service courses but introductions to entomology, intended to interest students in entomology and serve as a foundation for further entomological training. Speaking specifically for forestry, that is not what foresters want, and I doubt if many forestry departments would require such a course.

The entomology departments are on the horns of a dilemma. On the one hand, proliferation of courses to meet the various needs of all special professions that are affected by insect problems seems impracticable, and would weaken the departments by absorbing the time of teachers who should be teaching entomologists. On the other hand, the single course as proposed does not meet service demands.

Let us look at the problem from the viewpoint of a forestry school, with its crowded program of study. Protection of forests from ravages by insect pests has become an essential part of forest management, and every forester needs to have some specific knowledge about the insects common to his locality, how to get information about others, and how insect pests can be controlled silviculturally and by chemical means. In order to teach forest entomology effectively, the teacher must know much more than this. The teaching of forest entomology requires of the teacher not only a thorough knowledge

of forest insects, their habits, their physiological and ecological reactions, and their control, both direct and indirect, but also the principles of silviculture, forest management, forest economics, and all the other things that foresters must understand.

Thus, forest entomology has become a part of the forestry curriculum which can no longer be taught effectively by the "low man on the totem pole" in an entomology department. A teacher of forest entomology should know more of certain aspects of silviculture than most silviculturists, more ecology than most ecologists, and more about the insects with which he is concerned, their interactions with other living things, and how they can be controlled than the average economic entomologist. Usually we have to settle for less than this, but the above-described paragon is what a teacher of forest entomology should be.

The course in forest entomology from the viewpoint of the forestry school is an essential professional course. This being true, the school will naturally feel that it must exercise considerable control over the course.

Another fact that is frequently overlooked by the entomology department is how crowded is the schedule, in forestry and also in other professional fields. In forestry, for example, not more than a single course in entomology can be required of all foresters during the undergraduate program or some equally important subject will be crowded out. Therefore, forest entomology must be set up in such a way that no prerequisite will be needed. Desirable as it may be, a general course in entomology cannot ordinarily precede forest entomology.

In this matter we are faced with a situation, not a theory. Forestry has been used here as an illustration of comparable conditions existing in other disciplines. The question is, what should be done?

Forest entomology, medical entomology and some other applied aspects of entomology have reached a stage where they must be taught by specialists, specialists who are virtually members of the profession served, regardless of their official departmental connection. More and more these courses are being given without any preliminary general entomology. Some entomologists decry this trend when, instead, they should be encouraged by it.

Although foresters whom I have taught were not required to take the general course in entomology, many have become interested in insects through forest entomology and have later elected that course. A few have become forest entomologists, specializing in entomology on the graduate level. Experience indicates that this is a natural course of development for a student, although it is not recognized in the usual sequence of entomological programs of study.

Perhaps entomologists are wrong in assuming that the course in general entomology is the best starting point for entomological training. Why not start with the specific and proceed to the more general? Many entomologists, including the writer, followed that line of development.

Why not encourage professional schools to offer their own special courses, aided by cooperation rather than opposition from the entomology departments? Only when this cannot be done effectively should the entomology department provide courses adapted to their special needs. By spreading the introductory teaching over as broad a base as possible, students may become interested who would otherwise never take an entomological course, and the dilution of entomological teaching resulting from proliferation of courses could be avoided.

Even students who plan from the start to become entomologists, might benefit from an introductory course dealing with some relatively restricted aspect of the field before entering a general course. For example, a course combining external morphology and taxonomy, or one combining metamorphosis and natural history, or another combining evolution and geographic distribution, or one joining internal anatomy and functional physiology, or a course in agricultural economic entomology, might better serve to introduce students to entomology than would a general course. Following several such courses, a general course would be more appreciated. It could, then, be presented on a higher level than at present and would tie together basic concepts, learned in connection with courses that initially attracted the student's interest.

Entomological training has been set in a fixed pattern ever since entomology separated from zoology. Is it not about time to examine the procedures that have been accepted for so long, almost without thought? The revolutionary suggestions presented here are designed to stimulate such an evaluation.

BOOK REVIEWS

LABORATORY EXERCISES IN INSECT MICROBIOLOGY AND INSECT PATHOLOGY. By Mauro E. Martignoni and Edward A. Steinhaus. Burgess Publishing Company, Minneapolis, Minn., 1961. 8½ x 10½ in. x 75 pp. 4 figs., 7 tables and many lists. Price: $3.00.

Summarizing many years of experience in teaching in the Department of Insect Pathology, University of California, Berkeley, the authors give excellent instruction for a laboratory course to be completed in one semester at 3 hours a week. In 12 periods, during which from one to three experiments or demonstrations are performed, the student advances from the more loose types of relationships between insect and adventitious microorganisms to the closer ones betwen insect and symbiotes and finally to diseases, to which nine periods are devoted.

The individual subjects range from the sterilization of the external surface of insects to the observation of pathological and histopathological changes, the isolation, description and transmission of the pathogen, and the determination of the LD_{50}. Thus the student not only becomes familiar with many of the important techniques in this field, but also learns to know the major groups of insect pathogens, and obtains for an understanding of some of the methods and problems in this field. The experiments are presented in the following form: an "Introductory Note" briefly refers to the theoretical background; a complete description of the work to be performed, thoughtfully divided into steps, is given under "Procedure", correlated with a list of the "Materials Needed"; and a carefully chosen list of "Recommended Literature" refers to pertinent publications. Additional valuable information is given in the two appendices, the former describing staining and other techniques, and the latter listing the taxonomic categories of insect pathogens.

Although the book is truly scientific, it also considers the needs of the teacher. For instance, the experiments are so chosen that the student's interest is stimulated, while, on the other hand, many helpful details are included for the instructor. The list of insect hosts has been wisely restricted, and many of the necessary materials and articles of equipment can be procured with-

out difficulty. Thus, the book will not only be valuable for the student and the instructor of insect pathology, but also may encourage the teacher of entomology, microbiology, or pathology to include one or more of the experiments in his schedule. It even provides valuable information to the scientist in this field.

G. Wittig,
Entomology Research Division, Department of Agriculture

Bionomics, Systematics, and Phylogeny of *Lytta*, a Genus of Blister Beetle (Coleoptera, Meloidae). Richard B. Selander. Illinois Biol. Mongr. No. 28, 295 pp., 350 figs., Univ. Illinois Press, 1960. Paper, $4.50; cloth $5.50.

Most biologists today will agree that our primary concern is to understand the living organism, and in some cases, its control. We might then ask what the periodic revision of the classification of particular groups of organisms serves towards this end. For those not particularly concerned with the naming of organisms, Dr. Selander's monograph of the genus *Lytta* is a fine answer to this question. A critical study of this work will show the results of the practical application of the modern approach to systematics.

As the title reflects, the book is not only a set of keys and descriptions for identification, but a summary of our present knowledge of the living beetle, its habits, habitats, and life cycle. In addition to the formal morphological descriptions, there will be found distribution maps, field observations, and population analyses. The methods and techniques employed by Dr. Selander meet all of the requirements of modern research, with the possible exception that more statistical methods could have been used in a few cases. Teachers will find this monograph especially useful as a consistent and logically organized example of the presentation of modern systematic findings.

On the critical side, the treatment of the phylogenetic relationships is poorly documented. The author says, and correctly so, that modern systematics should show relationship by system (genetical descent), not relationship by similarity (morphological likeness). This he has done, and as a reviewer, I do not question his conclusions. If he had given us more details as to how he arrived at this phylogeny in a more graphic manner, it would have enhanced the work. For instance he says on page 27 that his classification is based primarily on morphology, but on page 30 where he gives us a phylogeny of the subgenera he implies descent, and his following discussion brings in features other than morphology. He does not make full use of either morphology or non-morphological characters, but leaves us to read his detailed descriptions to see how he arrived at these relationships. This is not unusual in works of this nature; to express graphically our feeling of these seemingly logical relationships is very difficult. It is for this reason that some people have expressed the opinion, as mentioned by Dr. Selander in his introduction, that such attempts are not necessary in systematics. We agree, however, with Simpson and W. L. Brown that it can be done by the concordance method. When presented graphically, it is convincing. Those intimately familiar with a particular group owe it to their fellow workers to express these things graphically even if the data are otherwise all there.

It is good to note that Dr. Selander stuck to binominals and did not burden the non-specialist with Latin subspecies, races, or similar nomenclatorial tangles. He even went so far as to suppress his previous subspecific names in favor of vernacular names. We hope others will follow this example.

In summary, this monograph is not only a useful working tool, but a pace setter for future systematic work.

R. H. Arnett, Jr.,
Catholic University of America

Ten Little Housemates, by Professor Karl von Frisch, translation by Margaret D. Senft from the fourth edition of the book Zehn Kleine Hausgenossen. Pergamon Press, Inc., New York. 1960. 5 in. x 7½ in. 146 pp. Illus. Price $3.00.

In this delightful little book Prof. von Frisch discusses ten arthropods that are common pests in households: the house fly, gnats (mosquitoes), fleas, bed bugs, lice, clothes moths, cockroaches, silverfish, spiders, and ticks. As stated in the conclusion, he meant this to be neither, a textbook nor an encyclopedia—"All I wanted to do was to give some information concerning small housemates whose names are quite familiar although little else is generally known about them. I also wanted to show there is something wonderful about even the most detested and despised of creatures." This he has done well.

The presentation is primarily on the natural history of his subjects, explaining what each does and how it fits into life in general, and seeking to dispell the age-old notion, that these animals are "bad guys" that maliciously prey on us "good guys."

In some sections the author ranges far afield from his main topic in order to illustrate some basic biological phenomena, but I think the reader will find these diversions interesting side lights rather than distractions. The style has an easy informality and humor that is both instructive and entertaining.

There are approximately 50 drawings, which are well done, well chosen as to subject and adequately labeled. However, they are definitely the text book type; they supplement the reading but their stiffness and lack of animation would not tend to stimulate interest in the young student or layman.

Control methods are intentionally given a secondary place in the book. Nevertheless, it is surprising to find that most of the methods that are described, we would consider 20 years out of date. DDT is the only new organic insecticide mentioned.

There are a few technical discrepancies here and there which probably occurred during the translation. The only serious error is a statement that wood ticks are harmless. In the original this evidently referred to ticks in Germany but this restriction would not be apparent to the layman reading the English version. On the whole, though, the translator has done a very good job.

The general reading level, according to my educational adviser (L. D. Y.) is 10th to 12th grade, although not beyond the capabilities of a junior high school student who has a genuine interest in biology. I believe it would make excellent supplementary reading for biology courses in these grades, and for adults who have an interest in biology. Even the entomologist may find some new information. At the end of the book Prof. von Frisch closes with this simple but cogent bit of philosophy,

There's nought so humble, nought so small,
But has a lesson for us all,
The self-same magic everywhere,
For eyes that see, and hearts that care,
Riddles abundant, near and far
From lowly flea to distant star.

J. S. Yuill,
Forest Insect Research U. S. Forest Service

A MANUAL OF COMMON BEETLES OF EASTERN NORTH AMERICA, by Elizabeth S., and Lawrence S. Dillon. Row, Peterson and Company, Evanston, Illinois and Elmsford, New York, 1961. 884 pp. illus. $9.25.

This is an imposing publication! The nearly 900 pages contain a great deal of information about a very large group of insects. The authors estimate that there are 10,000 species of beetles in "Eastern North America." Nearly 1200 of these are treated as common or are included in the book "because of their size, attractive coloration, or form."

The introductory passages set forth important information on methods of collecting, killing and preserving beetles as well as for preparing them for permanent collections and formal study. Unfortunately, larvae of beetles are treated in a very cursory manner. Even though lack of space may have prevented the authors from including information on how larvae of various groups are to be separated, their importance should have been dignified to the extent that methods of killing and preserving them should have been discussed.

Standard keys, accompanied by convenient illustrations of the structural characters used in the couplets, serve to separate the 64 families included in this work. Keys to genera are likewise frequently accompanied by helpful drawings, but keys to the species are less frequently illustrated. Black and white drawings of all the species treated are distributed on more than 81 full-page plates. Seventeen of the more striking species are also illustrated in color.

The volume closes with an extensive glossary, bibliographies arranged by subject matter and by geographic areas, and an index to all species and higher taxa referred to in the book.

In such an extensive work, which includes many difficult families, some minor errors are likely to be made. As examples: the authority for *Rhynchaenus* should be Clairville and Schellenberg (p. 773), that for *Phthorophloeus* should be Rey (p. 807), and that for *Orthotomicus* should be Ferrari (p. 814). I am also sorry to note (in the Preface) that one of the specialists, to whom gratitude for assistance is expressed, is spoken of as "the late Dr. E. A. Chapin." Dr. Chapin is currently active in research on systematics of Coleoptera.

It is impossible to ignore the author's treatment of the family Dermestidae (pp. 369-378). The genus *Byturus* is included in the family, without comment. On the other hand, doubt is expressed that *Thylodrias* belongs in the family. It is stated that the "only feature [of *Thylodrias*] which is dermestoid is its habit of attacking dried insect specimens." However, it is generally conceded that *Byturus* belongs in an entirely different family (and species of the genus certainly don't feed on dried insect specimens) whereas the important structural features of larval as well as adult *Thylodrias* indicate close affinity with other dermestids. The peculiar fact that the female of *Thylodrias* is without elytra or wings, whereas the male is fully winged, is missed completely, The species is described as "wingless" although the figure accompanying the description is of the male.

The real test of the usefulness of this Manual will come as attempts are made to recognize "common" beetles through the information made available. It is hoped that discrepancies such as those referred to above will detract only slightly from the value of this book which represents tremendous effort on the part of the authors.

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Entomology Research Division

THE BEETLES OF THE UNITED STATES (A MANUAL FOR IDENTIFICATION), by Ross H. Arnett, Jr. The Catholic University of America Press, Washington, D. C. Section 1, Fascicles 1-9, xi-210 pp. 196 figs., 1960. $3.50 (subsequent section will be priced according to the number of pages in each.) (Completed manual $25.00, optional binder $3.95.)

The publication of the first section of this book devoted to the beetles of the United States was eagerly awaited by those of us interested in Coleoptera. Now that we have seen this excellent section on the Cupedidae and the eight families of Adephaga, we are anxious for the approximately seven remaining sections that are scheduled to be finished by the fall of 1962. This volume, unquestionably, will be the most useful general work on North American Coleoptera to appear since Bradley's *A Manual of the Genera of Beetles of America, North of Mexico* which is now thirty years out of date and seldom available to beginning students.

The entire volume is being printed by letterpress on durable 6 x 9 looseleaf paper. An attractive green buckram, three post binder is optional. The looseleaf format permits easy revision of fascicles as needed. Each family is treated as a separate fascicle, with separate pagination and indexing. There also will be continuous pagination throughout the book and a general index at the end. This scheme allows three possible arrangements of the fascicles: (1) alphabetical, (2) phylogenetic, or (3) by page number as issued. Each U. S. family is treated according to the following outline: introduction; family name, author and date; common name; synonymy; general features; description; ecology; status of classification; general distribution and number of species; classification of U. S. genera and references. The family fascicles have been checked by 45 well known North American and European Coleopterists to assure accuracy and completeness.

This book will bring the classification of U. S. Coleoptera up to date and will provide: (1) a tool for the identification of the beetle families of the world, (2) illustrated keys to all of the U. S. genera (including most of the genera in Canada and Mexico), (3) the number and distribution of species, and (4) a working bibliography of references to anatomy, larvae, and biology of each family. In addition, keys to species are cited thus eliminating an extensive search of the literature when species identifications are wanted. A brief introductory study of the external anatomy of beetles is provided as an aid in the use of the keys. The illustrated keys are easy to use and are reversible so that they may be retraced if necessary. The excellent illustrations (196 in the first section) are with few exceptions originals by Miss Eileen Van Tassell and provide a very useful supplement to the keys and text.

According to the author, the scheme of classification used in this work is intentionally conservative and follows as closely as possible the traditional classification used in the United States. However, many of the changes proposed by Crowson in 1955 in his *Natural Classification of the Families of Coleoptera* are adopted.

This informative technical book surpasses any similar works on the U. S. Coleoptera. It is written and illustrated so that a novice as well as an experienced entomologist will be able to use it with ease and profit. The portion of each fascicle devoted to ecology should be especially valuable to anyone wanting information on habitats in which different genera usually can be found. Gaps in our knowledge of the beetles also are pointed out so these may be investigated.

The excellent treatise of the large and difficult family Carabidae by George E. Ball should not go unmen-

tioned. His work represents a tremendous amount of effort and will provide a solid foundation from which students of the Carabidae can build.

Other than a few typographical errors in some captions and in the text, there are few apparent misstatements or omissions in this first section. These are minor and certainly do not detract from the high caliber of the book.

Dr. Arnett should be heartily congratulated for this fine contribution to North American Coleopterology. This book will certainly stimulate interest and advance our knowledge of North American Coleoptera and will take its deserved position on the bookshelf with the classics of Bradley, LeConte, Horn and Blatchley.

I am certain that the coleopterists across the country join me in wishing Dr. Arnett continued success in completion of this monumental task.

PAUL J. SPANGLER,
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ANIMAL SOUNDS AND COMMUNICATION, Edited by W. E. LANYON and W. N. TAVOLGA, Publ. No. 7, American Institute of Biological Sciences, Washington 6, D. C. xiii + 443 pages, illus. With Demonstration Record (33-1/3 rpm) of animal sounds. Price, $8.50 to members, $9.50 to others.

Perhaps a better title for this book, containing eight papers presented at a Symposium of the A. I. B. S. and two later contributions, would be: Some Selected Aspects of Acoustical Behavior of Animals. A good idea of the degree of coverage of acoustical behavior of animals in general can be gained by considering the coverage of sounds and insects. There is only one article, by R. D. Alexander, devoted to the subject, and this is restricted to the saltatory Orthoptera and cicadas. There is nothing on sound reception proper and essentially nothing on acoustical behavior in moths, beetles, and flies, to mention only a few insects known to produce or respond to sounds. In short, the coverage is generally spotty and incomplete.

About half of the book is taken up with one of the articles added after the symposium, that by C. M. Bogert on amphibians and reptiles, a good review of the field. W. N. Tavolga has a paper on acoustical communication in fishes, and W. E. Lanyon and P. Marler have papers on bird songs. The Introduction by J. T. Emlen, Jr., and papers by N. E. Collias on ecological and functional classifications of animal sounds and C. F. Hockett on logical considerations in the study of animal communication are of a general nature, but include only a few references to insect sounds.

Two papers deal with techniques. P. P. Kellogg, in the second article added after the symposium, discusses tape recorders and recordings. His discussion is good, if one is interested in recording birds or mammals other than bats. The special problems faced in recording insect sound are scarcely mentioned. D. J. Borror has a short paper entitled: *"The Analysis of Animal Sounds."* This discusses only one type of sound spectrograph, and all of the examples, comprising most of the paper, are bird songs. Insect sounds usually present special problems in analysis, and Borror's paper is of limited value for entomologists, for it does not discuss the most useful analytical equipment and does not come to grips at all with the acoustical problems.

Except, therefore, for Alexander's paper, the book has little on insects, although Bogert's, Collias' and Hockett's papers are good reading for anyone interested in acoustical communication in general. The paper by Alexander is challenging and offers much for thought. It is marred, however, by far too many sweeping generalizations which published data or his observations do not justify without serious qualifications that are not even suggested. We can cite only a few. His ideas on "song quotas", for instance, are not supported by literature and certainly not by his anecdotes. In view of the number of senses known to be resident in the antennae of insects, it seems brash indeed to state: "In the Ensifera the antenna . . . literally 'trace out' the shape of objects encountered . . ." His statement that males, presumably in both cicadas and Orthoptera, need to hear their own singing for "restimulation" is mere supposition, and may be untrue for cicadas, as Pringle has shown. These ideas are interesting, but it should be made clear which are backed up by data and which are merely hypotheses. Entomologists seeking an introduction to this field will find Alexander's paper useful, but should accept the generalizations with caution.

A unique and valuable adjunct to the book is a phonograph record with examples of some of the sounds discussed. Only one band has insect sounds, illustrating Alexander's paper: songs of the field cricket (*Acheta pennsylvanicus*); cicada (*Tibicen septendecim*) and some katydids (*Microcentrum rhombifolium, Pterophylla camellifolia,* and *Amblycorypha rotundifolia*). Unfortunately, the transfer of tape recordings of insect sounds to disks usually results in unavoidable loss of fidelity at best. When, as in this case, there apparently was overloading and print-through on the original tapes, the result is disappointing.

Within the limited frame of reference set for the book, it is interesting and valuable. The vitality of the new bio-acoustics is perhaps best shown by the fact that at least one more book of at least this size could be produced without significant repetition. And much of the information needed for solid generalization is still to come.

HUBERT AND MABLE FRINGS,
Pennsylvania State University
University Park, Pennsylvania

NEW PUBLICATIONS

HOST INDEX TO HYMENOPTERA OF AMERICA NORTH OF MEXICO-SYNOPTIC CATALOG. G. D. Butler, Jr., and F. J. Santana have had printed a three-page index to the insect, flower visitor and host plant records of the well known *Hymenoptera of America North of Mexico* and the first supplement by Muesebeck, et. al. Copies are available from Dr. George D. Butler, Jr., Department of Entomology, University of Arizona, Tucson, Arizona.

INSECTICIDE RECOMMENDATIONS OF THE ENTOMOLOGY RESEARCH DIVISION FOR THE CONTROL OF INSECTS ATTACKING CROPS AND LIVESTOCK FOR 1961. Agriculture Handbook No. 120. Agricultural Research Service and Federal Extension Service, U. S. Department of Agriculture. 138 pp. Revised March 1961.

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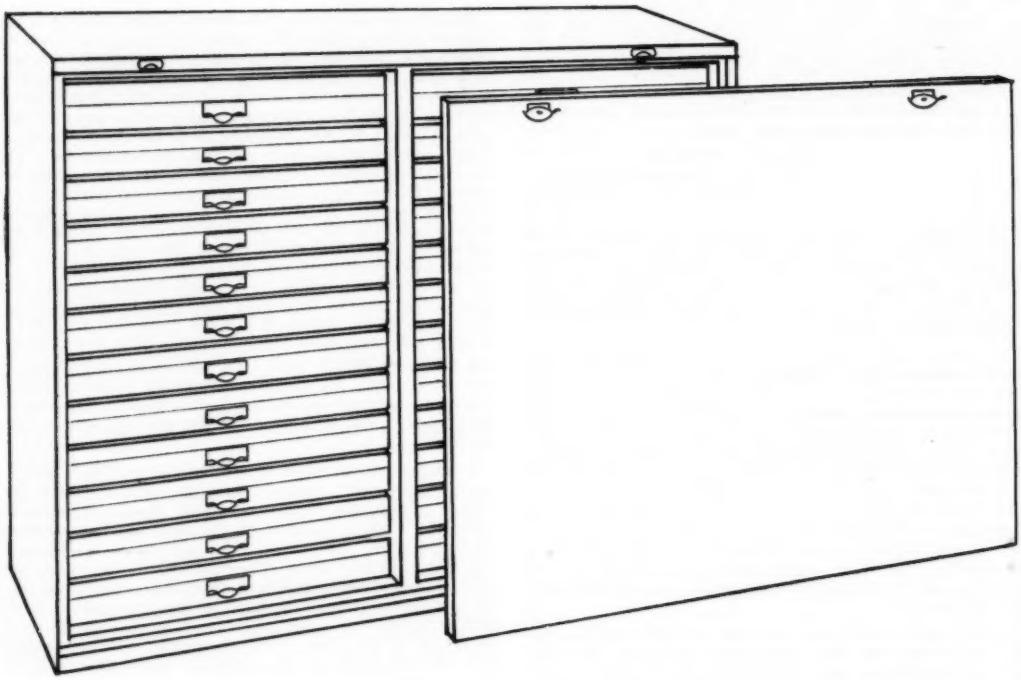

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Please note "Instructions for Submitting Titles and Delivering Papers" on page 57.

This form must be received on or before the August 15, 1961 deadline by the Program Chairman—

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Title: (*Brief, please.*)

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A	General Entomology	------	*Cd*	Ecology and Bionomics	------
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Cc	Relations of Insects to Plant Diseases	------	*F*	Chemical Control	------

Synopsis:

Authors' names and synopses will be printed separately from the tabular time schedule of papers in the program and will appear in the form shown on the reverse side of this page. **See over.**

In the following box, *type or clearly print,* in the manner described and suitable for submission to the printer, your name or names and a synopsis (not to exceed 50 words) of your methods and results. Double check the correct spelling of common and scientific names in "Common Names of Insects Approved by the Entomological Society of America," appearing in the BULLETIN, December 1960.

This space for use by Program Committee.

SECTION	DATE	DAY	TIME	PAPER NO.	RECEIVED	MISC.

EXAMPLE

Authors' Names and Synopsis

C. T. Rivera and A. L. Steinhauer. *D. melanogaster* larvae were reared on a chemically defined medium. The molecular nitrogen content was adjusted to five levels, and the adult flies reared from these different media were tested for DDT susceptibility by a contact method. The results indicate decreased susceptibility to DDT with increased nitrogen in the diet.

ENTOMOLOGICAL SOCIETY OF AMERICA MEMBERS PLEASE NOTE

1. **Dates for the Miami meeting: November 27-30, 1961.**
2. **Program Highlights in the front of this issue of the BULLETIN.**
3. **Submit your title and synopsis (see over) before August 15, 1961.**
4. **Collecting trips and other outside activities are planned.**

NOTICE TO SPEAKERS

Slides should be prepared in accordance with a paragraph on this subject on the inside front cover of the March 1961 BULLETIN OF THE ENTOMOLIGICAL SOCIETY OF AMERICA. See also M. P. Jones' article mentioned therein.

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